BOSTON UNIVERSITY
SCHOOL OF EDUCATION

Thesis

RESEARCH

"The History and Development of Tests and Examinations"

Submitted by

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Acknowledgment

W. Caldwell and Courtis, THEN AND NOW IN EDUCATION

D. Paterson, PREPARATION AND USE OF NEW-TYPE EXAMINATIONS

G. Ruch, THE OBJECTIVE OR NEW-TYPE EXAMINATION

E. White, ELEMENTS OF PEDAGOGY

Wilson and Hoke, HOW TO MEASURE

Introductory Statement

The purpose of this work is to make a careful study of the history and development of tests and examinations,-their purpose, their form, their merits and abuses.

Webster, in the New International Dictionary, states that an Examination is an act of examining, or state of being examined; a search or investigation; scrutiny by study or experiment. A process prescribed or assigned for testing qualifications.

An effort has been made to compile into one convenient volume outstanding facts apropos to the history and development of tests and examinations, (exclusive of the so-called intelligence tests).

Because of the multiplicity of publications and research appurtenant to this field of view; it is evident that a single volume could not be complete, however, it is the hope of the arranger that with the available bibliography of about 600 references and the carefully detailed index it will prove very usable and profitable.

In addition, definite references of available materials regarding the measurement of many specific school subjects and the addresses of publishers of Educational Tests, are given in order that this contribution to Education may be of definite practical value.

page

Part 1

Examinations

page

Part 1. (cont.)

PAGE

Part 11

Extracts from:

History of Examinations

There was in China, 2200 years before Christ, a system of examinations for the purpose of selecting officers for the government service. This continued until A. D. 1906, when it was abolished, and as a partial substitute an annual examination was held in Peking of Chinese graduates educated abroad. 1.

Socrates, the Athenian philosopher, in 400 B. C., asked profound and searching questions of those with whom he chanced to converse. His methods and purposes were comparable to the accepted procedure of educational practices of today. 2.

Sometime after 307 B. C. special aptitudes of pupils became noted and developed within a sort of conservatoire of music at Alexandria, where poor boys with good natural voices were supported and trained. There were competitions which were in the form of a school examination with prizes. There were also examinations held to test the qualification for a post. 3.

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1. For more complete details see Encyclopaedia Britannica Eleventh Edition Vol.X page 35, and Lang, Modern Methods in Written Examinations page 135 in Part 11.

2. Robinson and Breasted OUTLINES OF EUROPEAN HISTORY, see page 37, and Lincoln Library page 1628

3. Mahaffy, J. P., GREEK LIFE AND THOUGHT, Macmillan Co., 1887 See page 185 in Part 11.

The Catechetical method of questions and answers, which was begun in the Catholic Church, reached its fullest development in the 3rd and 4th centuries, and has continued down through the ages. 1.

The 12th and 13th centuries marked the beginning of the Medieval universities. Disputation, determination, defense of a thesis, or the delivery of a public lecture are some of the forms which examinations took at these early schools. 2. The subjects in which the medieval universities examined were those of the trivium and quadrivium in the faculty of arts; theology; medicine; civil law; and canon law. 3.

The beginning of the method of examinations, as we now understand the term, was in the 16th and 17th centuries. At the Merchant Taylor School in London the first examination was held. It was devised to bring out active and initiative powers of pupils even more than to test mere retentive capacity. 4. Comenius, it is recorded, planned university training for only those who could pass rigid examinations. 5.

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1. Lang, MODERN METHODS IN WRITTEN EXAMINATIONS, page 135 in Part 11
2. Ibid - 65
3. Ibid - 70
4. Ibid - 43
5. Ibid - 136

Of course practical examinations were employed for a long time in the medieval universities in such a subject as medicine, but all others were probably oral until 1702 when Bently introduced at Trinity College, Cambridge, the written form. 1.

The next development of this subject was to test ability to enter professions, for which up to the nineteenth century preparation through a period of apprenticeship was prevalent. 2.

Examinations had previously been qualifying tests to ascertain whether a candidate had reached a definite standard. A further extension of this was the competitive examination by which candidates were not only required to attain a standard, but were arranged in order of merit. 3.

In 1848, Dr. Whewell introduced examinations in the elementary school, and in 1861, Rt. Robert Lowe submitted the results of the elementary examinations as a basis for Government grants. However, in 1897 this system of payment by results was abolished. 4.

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1. Ibid. - 39
2. Ibid. - 40
3. Ibid. - 41 and 84
4. Ibid. - 48 and 101

The first attempt at standardized objective tests was done by the Reverend George Fisher, an English schoolmaster, in 1864. 1.

In America, the first examination of historic interest was The Boston Examination of 1845. It was really a survey. 2. Two young tutors in mathematics introduced the written examination at Harvard. That being so, Harvard's first written examination was held in 1857. 3.

It is significant to note that the initial works of Mann, Fisher, and Rice were all so far ahead of their time that their efforts had little influence on education then, but Thorndike, who was a student in Columbia University, took up the work initiated by those sincere early educators and fostered it until the other educators and the general public were ready to recognize its benefits and profit by its possibilities; thus their untimely efforts were not lost to posterity. 4.

The objective type test has been advocated since 1920, (5) and the standardized test since 1905.

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1. Encyclopaedia Britannica XIV Edition.
2. See page 140, O.W.C.Caldwell and S.A.Curtis, THEN AND NOW IN EDUCATION, 1845-1923 Copywright 1923, by World Book Company of N.Y.; also page 135, Lang, MODERN METHODS IN WRITTEN EXAMINATION. Part II.
3. Ibid-115.
4. Encyclopaedia Britannica XIV Edition.
5. Part II page 143.

A. S. Barr, in the REVIEW OF EDUCATIONAL RESEARCH, supplies information concerning the uses of tests and measurements in China, England, France, and Germany. There is plenty of evidence to show that educational tests are in process of development in China. The Chinese movement of the 20th century is the result of American influence.

The tests in England, France, and Germany have also been stimulated in part by American influence, but they also show a point of view distinctly their own. In England, statistics is still a dominant interest. France is interested chiefly in intelligence tests, while Germany has specialized in aptitude testing. In Europe, educational tests are used for the most part as aids in research. Many of the foreign studies are more extensive and thorough than those in this country. American workers can derive much benefit by familiarizing themselves with the methods and point of view of their fellow-workers in foreign countries. 1.

Lee and Symonds have written an excellent summary of investigations concerning objective tests reported between Oct. 1931 and Oct. 1933; they included a bibliography of 104 references. Holzinger and Seineford have compiled three annual annotated bibliographies of selected references of the theory of test construction. 2.

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1. Barr, A. S. REVIEW OF EDUCATIONAL RESEARCH pp. 443-455 April 1935.

2. Bibliography.

Standardized tests, as well as teacher-made tests and quizzes, are used least by the industrial arts, home economics, fine arts, and physical education departments. The English department, though not ranking high in the other forms of measurement, ranks second in the percentage of teachers who use standardized achievement tests. Fifty-four percent of the English teachers gave one or more standardized tests. This is not especially surprising considering that there are more than a hundred tests published for the use of English teachers.

Recently there has been some slight tendency for authors to prepare standardized tests to accompany their own textbooks. There also have been a number of published courses of study which have included tests to measure the material covered. 1.

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1. Testing Practices of High School Teachers. U. S. Dept. of the Interior. Office of Ed. Bulletin No. 9. 1936.

There are four types of measurements in the modern school today.

They are:

1. Oral questioning
2. The written examination
3. The standard test
4. The objective or new-type examination

There are other means of evaluating school results, but the four types mentioned are the most frequently used.

The standardized examinations have just completed the first quarter century of their existence. From a few pioneer attempts by Rice, Thorndike, Stone, Curtis, and others, the movement has grown until conservative estimates place the total number of available tests and scales at five hundred at least; there are probably considerably more. It is impossible to secure even approximate estimates of the numbers of standard tests administered annually. There are several educational tests whose sales have passed the million mark annually. In one or two cases, two million is a more nearly correct figure. The total number of standard tests sold during the year 1925 was probably at least twenty million, possibly somewhat more. 1.

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1. Ruch, THE OBJECTIVE OR NEW-TYPE EXAMINATION.

What are the functions served by the examination?

Although a great many specific functions have been claimed for the written examination by one writer or another, Ruch presented the following:

1. "Motivation of the learning of pupils.
2. Maintenance of standards of accomplishment.
3. Training in the use of the English language.
4. Measurement of accomplishment." 1.

What is the criteria of a good test or examination?

The criteria for use in the construction of standard and unstandardized tests naturally differ inconsiderably among educators. Dr. Wilson submitted the following:

"Primary or major criteria. The major criteria relate to the ends which should be served by testing and which are more fundamental than the testing itself.

1. A test should be in harmony with and reinforce the right curricular principles.
2. A test should encourage, supplement, and reinforce proper methods of teaching.
3. A test should serve the true purpose of an examination." 2.

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1. Ruch, THE OBJECTIVE OR NEW-TYPE EXAMINATION.
2. Wilson, G. M., CRITERIA OF A STANDARDIZED TEST, Educational Review, March, 1926.

"Secondary or minor criteria:

Examinations are a means, not an end. Standardized tests are likewise a means, not an end. Unless a test meets the three primary criteria already stated, it is bad and should be abandoned. However, it may meet the three primary criteria and still not be nearly as good a test as possible. There are further refinements and these refinements have been the particular contribution of the scientific workers in the field of educational measurement....In general, the results of such refinements upon a test are to make it more valid, more accurate, more reliable, more objective, more economical to administer, and more valuable in its interpretative results." 1.

What is a good test?

1. "A good examination is the best teaching which can be done at the time.

2. A good examination provides for a new view, a reorganization, or a worth-while application." 2.

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1. Wilson, G. M., CRITERIA OF A STANDARDIZED TEST Educational Review, March, 1926.
2. Ibid.

Purpose

Examinations were used in early times for the purpose of selecting men for the government service in China. 1.

During the middle ages examinations were employed to choose church men, teachers, and doctors. 2.

At the Merchant Taylors' School, in the sixteenth century, examinations were devised to bring out the active and initiative powers of pupils. 3.

The foundation deeds of endowed schools sometimes contained a provision for an examination. The object of this seems to have been rather to ascertain that the teaching was satisfactory than to classify the students. 4.

In common with the various trade guilds of the time, the teaching guild had its successive stages of apprentice, journeyman, and master. Promotion from a lower stage to a higher one depended upon passing an examination. The completion of the apprentice stage entitled the candidate to the baccalaureate degree, and was determined by a test of his ability to define and explain terms. 5.

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1. See page 35 in Part 11.
2. Ibid. - 39.
3. Ibid. - 43.
4. Ibid. - 100.
5. Ibid. - 136.

In France the examination of the baccalaureate, though conducted in part by the university examiners, became a school-leaving examination. 1.

Defenders of examinations were of the opinion that tests were necessary in order to determine the efficiency of schools to which grants of public money were given. 2.

In 1886 the use of the results of written examinations as a basis for the promotion of pupils was general in the graded schools in the United States. However, in 1893, pupils were promoted on the estimates or judgment of teachers in many cities, including nearly a score of the largest cities in the country; and many other cities made the teacher's judgment a considerable, if not the chief, element in the promotion basis. This testimony seemed conclusive that the non-use of promotion examinations had been attended with a gratifying improvement in the spirit of the schools, in less mechanical and more rational teaching, and in the attainment of better results; and, where the estimate plan had been intelligently administered, there was no loss in classification.

In 1886 it seemed wise to use examinations for teaching purposes. 3.

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1. See part 11 page 75.
2. Ibid. - 94.
3. ELEMENTS OF PEDAGOGY by Emerson E. White, Am.Book Co.N.Y.

White suggests further that examination results should not be made alone the chief basis for the promotion of pupils." It seems unnecessary to add that it is not proposed to dispense with examinations for teaching purposes; examinations instituted for the one purpose of testing the results of instruction and study as a means of improving them. The remedy proposed is the non-use of the results of stated examinations as a basis for the promotion of pupils, not the non-use of teaching tests." 1.

President Eliot of Harvard stated that "examinations are much more than a means of grading students. They prepare young men to meet the similar crises which they constantly encounter in after-life, particularly in the professions, -both learned and scientific, -in the public service, and in business administration." 2.

Using tests for what they may contribute to the realization of the important aims of education and the solution of educational problems appears decidedly to be the modern tendency. 3.

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1. White, Emerson, ELEMENTS OF PEDAGOGY, Am.Book Co., N.Y.
2. Eliot, Charles, UNIVERSITY EXAMINATION.
3. Journal of Ed. Research, March, 1935.

Hygiene requires that examinations should be given for the sake of the students, and not in behoof of an institutional standard. Apart from examinations at graduation and the like, the chief reason for formal tests is to determine a pupil's fitness for doing profitably a higher grade of work. When this can be determined without examination, a formal test is unnecessary. 1.

Survey testing of educational attainment has become a large and well-established part of school surveys. Many have contributed to this movement,- Harris, Moore, Strayer, Ayres, Judd, and others. The "Survey movement" had its day: its methods continue to be used.

Achievement testing is now a regular part of school surveys. 2.

"Scientific research leads eventually to practical uses, and practical research becomes a complement or a consequent of its more respected antecedent." 3.

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1. See page 60 in Part 11.
2. Ibid. - 111.
3. Strang, Ruth, TEACHERS COLLEGE RECORD Vol. xxxv No. 2, Nov. 1933, Columbia University, pp. 120-133.

Form

First tests were oral. 1. Socrates used the question and answer. 2. The Church practised likewise and still does,with explanations to convey the true understanding of the lessons to be learned. 3.

The early universities used different forms: those of disputations, determinations, defense of theses, and public lectures. 4.

A disputation is an act of disputing, controversy; debate; a formal exercise in which parties reason in opposition to each other. In college it is an exercise in which one person argues a question.

Determination is a discussion: the resolving of a question by argument or reasoning. In English universities, a disputation was formerly held by those just made bachelors of arts as a condition of proceeding toward the master' s degree.

Defense of theses and public lectures were other similar forms.

At Oxford, disputations were apparently the only test applied in its early history. 5.

The doctoral examination at Bologna, in the 13th and 14th centuries, consisted of two parts - a private examination which was a real test, and a public one of ceremonial character (conventur). 6.

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1. See page 39 Part 11.
2. Ibid. - 37
3. Ibid. -"History of Education" Patrick J. McCormick, Cath. Ed. Press, Wash. D. C. 1916
4. Ibid. - 65
5. Ibid. - 70
6. Ibid. - 64

From notices of contests between the universities and the medical corporations in London, one may gather that students had to pass an examination, after going through their apprenticeship, before being allowed to practise. But an examination was never the sole test; it was always attached to a prescribed course of study and service. 1.

In medicine, the clinical examination of a patient was a test carried out under conditions more nearly approaching those of actual work than any other; and distinction in medical examinations was probably more often followed by fame in after life than was the case of other examinations. 2.

At the French examinations for the prix de Rome, the candidates were required to execute a painting in a given number of days, under strict supervision (en loge). 3.

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1. See page 39 Part 11.
2. Ibid. - 83.
3. Ibid. - 83.

The thesis is a long essay, based on original research work and offered by a candidate for an advanced degree.

At Cambridge University, England, the examination (Tripos) was instituted in the first half of the 18th century for honors in mathematical science. Since 1824, the final honors examination in classics was held, to which, until 1850, only those who had previously obtained honors in mathematics were admitted.

The word tripos was first applied to the three-legged stool on which sat a bachelor of arts appointed to dispute humorously with candidates for degrees; then to the man himself; then, until 1894, to a set of versed (tripos verses) composed by him and published at commencement; then to the list of successful candidates for honors, printed on the back of the paper containing the verses; then to the examinations.

The so-called new-type of examination has a great many questions requiring short answers in contrast to the old essay-type requiring long answers to a short number of questions.

The standardized test has the possibility of more accurate measuring. There are many good standardized tests. On the other hand, there are so many poor standardized tests, that extreme care is needed to prevent interference with good instruction, and the setting up of false standards.

Units worked out in school and in conferences with the teacher are the very latest testing procedures (1938). Thus, school life is becoming more nearly like real life situations.

As early as 1925, the National Educational Association found that in all cities of the United States of 25,00 or more inhabitants some recorded form of rating was in use. 1.

In the college world the Honors System as used at Swarthmore, and in part in many other colleges, frees an abler student in junior and senior years from required attendance at lectures and recitations -the work done being individual, with frequent conferences and final comprehensive examinations. 2.

Granting the need of measuring and recording in some definite way the progress of pupils in academic skills and achievements, it is not necessary to use the recitation as a means for securing marks. In progressive schools, the formal recitation is discarded, the academic standing of the children, when desired, being arrived at by other means. In place of the recitation are activities, projects, research, and reports. Or, if text-book work is assigned, the discussion of the lesson is in the form of a conference, in which the matter of marks is removed entirely from the consciousness of the children. 3.

At Yale a new system of general examinations, in which students will take tests in their major field, was announced in 1936. 4.

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1. Flinn, Vee -A TEACHER RATING BY PUPILS. Educational Method Vol.X1 No. 5. Feb.1932 pp. 290-295.

2. Cobb, Stanwood: THE NEW LEAVEN page 206.

3. Ibid. - 207.

4. Pathfinder, Pub, by the Pathfinder Pub. Co,, 2414-16-18 Douglas St., Washington, D. C. Oct. 10, 1936. No. 2232.

Merits

A test is an aid to teaching. Dr. Guy Wilson, Professor of Education in Boston University, stated in one of his books that a test should be "the best teaching at the time." (1) This is true at all levels, but first let us consider the primary grades. Pennell and Cusack have stated that the use of informal and standard tests should help the teacher in knowing the needs of her children and in fitting her work to those needs. The test should help the child by showing him his power in reading, his help along certain lines, and the improvement that he makes. It is a great incentive to a child to see, in class graphs or in individual graphs which the teacher makes from the results of the tests, where he is in relation to the rest of the class, as well as the improvement that he is making. (2)

In like manner it helps a school system to estimate itself in relation to another school system.

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1. Wilson and Hoke, HOW TO MEASURE Last Chapter
2. Cubberley, Ellwood P.
   Education in the United States Pg. 446-449

The result of a standardized test is an impartial way of showing parents just where their child stands in relation to others in the group, and likewise it is an effective device whereby one school can learn its particular place nationally.

The standardized test is an aid to the type of child or student who would be underestimated except for such a check.(1)

It also helps the teacher who otherwise might be insufficient. (2)

Examinations also compel indifferent and careless students to do some work and are a valuable training for later life.(3) Moreover, they oblige a person to be able to produce his knowledge. (4)

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1. Hildreth, Gertrude
   Mental Ability Measured by Verbal and non-verbal tests
   Teachers College Record, Nov. 1932. pp.134-144

2. E. White, ELEMENT OF PEDAGOGY Chapter on Tests

3. Ibid page 115

4. Ibid 102

Abuses

Books on Education in years past were ever quoting the abuses and evils of examinations.

Regarding the money grants to schools as a result of the examinations, the majority held that so long as money value was attached to success in individual tests the children's health and welfare was endangered. It was, however, in the field of secondary education that the tyranny of examinations were felt. (1)

"The use of written examinations", says White, "have been the prolific source of bitter jealousies and rivalries between schools and teachers, and they have otherwise been attended by serious evils. They have perverted the best efforts of teachers, and narrowed and grooved their instruction; they have occasioned and made wellnigh imperative the use of mechanical and rote methods of teaching; they have occasioned cramming and the most vicious habits of study; they have caused much of the overpressure charged upon the schools, some of which is real; they have tempted both teachers and pupils to dishonesty and, last but not least, they have permitted a mechanical method of school supervision." (2)

These evils have not disappeared even with the advent of the standardized test.

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1. Part 11, page 49

2. E. White, ELEMENT OF PEDAGOGY Chapter on Tests

There are many factors that enter into the testing situation: the individual's physical and mental health at the time of the examination; the weather, and the kind of test.

Research has shown that the use of only a few questions means that a test is so unreliable as to be practically worthless. It is commonly accepted by writers on measurement that an objective test should have a hundred items to have sufficient reliability to be valuable as a measuring instrument. (1)

Research reveals that children prefer the so-called new-type examination to the old essay-form of test. (2)

A good standardized test in the hands of an inexperienced teacher may be a regrettable abuse.

Often a test does not coincide with the subject matter taught. (3)

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1. Testing practides of High School Teachers, U.S. Dept. of Inter., Office of Education, Bulletin No. 9, 1936

2. Paterson, PREPARATION AND USE OF NEW-TYPE EXAMINATIONS

3. White, E., ELEMENTS OF PEDAGOGY Chapter on Tests

The studies of Starch and Elliot have become a classic reference on the variation of teachers' marks for essay examination papers. The teachers gave one paper grades ranging from 64 to 98 percent, etc.

Tests tend to destroy spontaneity. Nine young people out of ten may quite rightly be made to move in a good "regulation groove" but the tenth would be better for having room to expatiate. (2)

Those which deal with general education should not be continued beyond the age of 22. Professional examinations or examinations in the highest parts of science, intended for those who mean to give their lives to study, must come later, but should be as little competitive as possible. (4)

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1. See Index, Part II page 201
2. Part II, page 103
3. Ibid 103
4. Ibid 103

As early as 1908, the distinguished Charles Eliot sighted the fact that "A generation is growing up in many parts of the country which has successfully avoided examinations, having acquired the belief that examinations are an evil, instead of a profitable means of sound training." (1)

A dissertation written at leisure is an excellent means of judging qualifications, and may be used for those who are past the proper age for examinations. (2)

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1. Eliot, Charles. UNIVERSITY EXAMINATIONS
2. Part II, page 104

"If education were indeed an industry dealing with raw materials of fixed or measurable quality, subjecting its materials to routine processes, these tools of measurement would probably be acceptable and adequate on the whole. But education is not an industry. It is a highly complicated process. The "stuff" with which it deals is precious human material, infinitely diverse and complex. Human personality and growth and character cannot be expressed by an equation or a symbol. Sooner or later all of this will become a matter of common knowledge and understanding and then perhaps someone will get out an injunction restraining us from carrying on the pretense that we can evaluate and rate pupils by mathematical formulae or alphabetical symbols." (1)

This criticism is aimed at all examinations particularly the standardized test.

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1. Lund, John, UNDERSTANDING THE CHILD. April, 1934, pg.23

CHRONOLOGY

2200 B.C. Examination for Civil Service in China.
468-399 B.C. The Socratic method of question and answer.
3rd century tests of qualification at Alexandria.
3rd and 4th centuries fullest development of the Catechemenate.
12th century Beginning of universities of the Middle Ages.
1562 1st examination, Merchant Taylor School, London.
1592-1671 Founding of university training after examination by Comenius.
1661 Test Act.
1693 Corporation Act.
1702 Introduction of written examination at Trinity College.
1747 First honors examination-Mathematical Tripos.
1802 Examination for B.A. degree.
1824 Cambridge founded the Classical Tripos.
1836 Teaching and examining functions of London University dissociated.
1845 Boston Examination - A survey.
1848 Introduction of examinations in elementary schools by Dr. Whewell.
1851 Moral and Natural Science Tripos.
1853 Beginning of decline of emphasis upon technical grammar.
1854 Competitive Examinations in England for public posts.
1857 Harvard's first examination.
1858 School leaving examinations.
1864 First attempt at standardized objective tests by Fisher.
1871 Accrediting system.
1886 Use of results of examinations as basis for promotion.
1890 Abolition of individual examinations."examination by sample" introduced.
1893 Promotion of pupils on estimates of teachers in some places.
1897 Abolishment of system of payment by results.
1905 1st standardized test.
1908 Beginning of general belief to avoid examinations.
1912 Variation in marking of teachers proved by experiment.
1920 Objective type of examination advocated.
1925 Beginning of achievement testing on national scale.
1928 Superior student freed of recitation advocated by Stanwood Cobb.
1933 Scientific research more in evidence.

SUMMARY

These are records of examinations in China, 2200 years before Christ, and a variety of tests are noted in Greece at least as early as 500B.C.

The Holy Bible discloses several choice references to reconnaissance and to introspection. Socrates is given recognition, and deservedly so, in many educational books because of his unique manner of questioning. The Catechetical method-that of question and answer-which was markedly prevalent in the 3rd and 4th centuries.has continued through the ages.

The present examinations in universities are naturally an outgrowth of the procedure in the medieval universities.

Presumably all examinations were oral until the 18th century when the written mode came into practice.

About the middle of the 18th century the examinations invaded the elementary schools.

The initial purposes of examinations were for the selecting of suitable applicants for service in the government and professions. The schools examined for the baccalaureate, entrance to college, grades, and money grants.

Up to and including the first part of the 20th century very little was written in favor of the examinations; on the contrary they were subjected to much adverse criticism. Of what kind were those objectionable tests? They were imposed by authorities and usually unscientificatly made, administered, and corrected.

The time was, quite a number of years past now, when the gentleman who was the best arguer, in other words, the one whose attractive personality and clever ability in the use of persuasive oratory was the one whose golden oppinions were accepted as unimpeachable. Fortunately this regrettablc attitude is non-existant among the majority of thinking people today.

The wealth of scientific induction available at the present time is, and should be, the only sound estimate which should guide our thoughts and alter our decisions.

"Scientific thinking is better thinking", stated Victor Noll.

Research tells us that a test must have at least 100 items to be valid. Research proves that children and students prefer the so-called new type of examination to the oral essay form of test.

Research has revealed that teachers' marks vary so that practically no faith can be placed in them. The standardized test would appear to meet the need in this field.

The Journal of Educational Research of March 1935 states that "The general opinion seems to be that the influence of measurement upon instruction may be either beneficial or harmful depending primarily upon the nature and quality of the measuring instruments used."

May we, who are intrusted with a portion of this world's knowledge, and are chosen instruments for the guiding of youth, use tests wisely - as an aid to teaching, to find just where our opportunities for service are, and not abuse this sacred trust which, for a time, is ours.

PART II

(Being an assembly of quotations on examinations, throughout the history of education.)

System of Examinations in China from 2200 B.C.- 1906 A.D.

The following selection is copied verbatim from Encyclopaedia Britannica 11 Edition page 184.

The bureaucratic element was a vital feature in the government of China, the holding of office being almost the only road to distinction. The ranks of the civil service were recruited by means of examinations. Up to the beginning of 1906 the subjects in which candidates were examined were purely Chinese and literary with a smattering of history. The old system was closely identified with the life of China.

As a general rule students preparing for the public examination read with private tutors.There were neither high schools nor universities where a regular training could be obtained. In most of the provincial capitals, and in some other places, there were institutions termed colleges,supported to some extent from public funds, where advanced students could prosecute their studies; but before the movement initiated by the viceroy Chang Chik-tung after the China-Japan War of 1894, they hardly counted as factors in the national education. The private tutors, on the other hand were plentiful and cheap. After a series of preliminary trials the student obtained his first qualification by examination held before the literary chancellor in the prefecture to which he belonged. This was termed the Siuts'ai, or licentiate's degree, and was merely a qualification to enter for the higher examinations. The number of licentiate degrees to be given was, however, strictly limited; those who failed to get in were set back to try again, which they might do as often as

they pleased. There was no limit of age. Those selected next proceeded to the great examination (termed Chujen or provincial graduate) held at the capital of each province, once in three years before examiners sent from Peking for the purpose. Here again the number who passed was strictly limited. Out of 10,000 or 12,000 competitors only some 300 or 350 could obtain degrees. The others as before must go back and try again. The third and final examination took place at Peking and was open to provincial graduates from all parts of the empire. Out of 6,000 competitors entering for this final test, which was held triennially, some 325 to 350 succeeded in obtaining the degree of Chin shih, or metropolitan graduate. These were the finally selected men who became the officials of the empire.

Socrates

The following selection is copied verbatim from Outlines of Eu ropean History by Robinson and Breasted Ginn and Co. Boston 1914 page 205

Socrates was accustomed to stand about the market place, the street corners, and the public baths all day long, insisting on engaging in conversation every citizen he met, and asking a great many questions which left the average citizen in a very confused state of mind. He seemed to call in question everything which the citizen had formerly regarded as settled. Yet this familiar and homely figure of the stone mason's son was the personification of the best and highest in Greek genius. Without desire for office or a political career, Socrates' supreme interest nevertheless was the State. He believed that the State, made up as it was of citizens, could be purified and saved only by the improvement of the individual citizen through the education of his mind to recognize virtue and right. He taught that by keen questioning and discussion it is possible to reject error and perceive these realities. The simple but powerful personality of this greatest of Greek teachers in the streets of Athens often opened to him the houses of the rich and noble.

They summoned Socrates to trial for corrupting the youth. He might easily have left Athens when the complaint was lodged against him. Nevertheless he appeared for trial, made a powerful and dignified defense and, when the court voted the death penalty, passed his last days in tranquil conversation with his friends and pupils, in whose presence he then quietly drank the

fatal hemlock (399 B.C.) Thus the Athenian democracy, which had so fatally mismanaged the affairs of the nation in war, brought u pon itself much greater reproach in condemning the death, even though in accordance with law, the greatest and purest soul among its citizens.

The undisturbed serenity of Socrates in his last hours, as pictured to us in Plato's beautiful account of the scene, profoundly affected the whole Greek world, and still forms one of the most precious possessions of humanity. But the glorified figure of Socrates, as he appears in the writings of his pupils, was to prove more powerful even than the living teacher.

The following portion is copied verbatim from Encyclopedia of Education edited by PAUL MONROE, Ph.D.

Examinations. - A term used to denote the method of testing educational progress, measured either by amount of knowledge acquired or by general intellectual capacity or ability. Such a method has been applied in all grades of education in one form or another. The earliest type of examination which prevailed was oral, either in the form of question and answer (cf. the textbook of Aelfric (q.v.), which would lend itself to such a method) or of disputations (q.v.). Disputation, determination, defense of a thesis, or the delivery of a public lecture, provided other requirements such as payment of fees, residence, and attendance at lectures were satisfied, are forms which examinations took at the medieval universities (q.v.); (for details and differences at various universities, see also Degrees). The written examination was unknown at the universities probably until 1702, when it was introduced by Bentley at Trinity College, Cambridge. Practical examinations had been employed for a long time in the medieval universities in such a subject as medicine. But the examination in its modern form is a development of the eighteenth century. The first honors examination, the earliest examination in the modern sense, was the Mathematical Tripos, founded in 1747. The qualification for a degree was in fact merely four years' residence. Those who worked did so at their pleasure; for those who would work there were, even in the worst times, adequate lectures. The Tripos introduced a new order of things, but until 1797 the proctors added any names they liked

to the list. In 1772 the Master of St. John's College, Cambridge, established examinations in his college (Graham Balfour, Educational Systems). The lead was taken up by Oxford in the famous "Oriel" revival. Before the end of the century examinations were introduced into Christ Church by Cyril Jackson, and in 1795 Oriel College began to elect to its fellowship from outside solely on the results of its own examinations. Oxford now progressed more rapidly than Cambridge. In 1802 a genuine examination for the B.A. degree was begun and a small honors list with the names in the order of merit was published. Between 1802 and 1870 there was an examination for the M.A. degree, but this never became effective, and there is not to this day any examination for the master's degree at Oxford or Cambridge. "In 1829 the Master and Fellows of Balliol began to elect scholars after examination.... The most brilliant success attended these reforms, and encouraged similar measures elsewhere" (Balfour). Meantime in 1824 Cambridge had founded the Classical Tripos, though until 1850 it was only open to those who had passed in the Mathematical Tripos. The Moral Science Tripos and the Natural Science Tripos followed in 1851. In 1850 Oxford reorganized her examinations "and introduced Moderations as a test of pure scholarship in the middle of the University course." From this time forward new schools and triposes were created in rapid succession at Oxford and Cambridge.

A second development of examinations was to test ability to enter the professions, for which up to the nineteenth century

preparation through a period of apprenticeship had prevailed. While many of the old professional societies have remained unchanged, the method of admission has been changed to an examination basis. For details see articles on ACCOUNTANCY EDUCATION; LAW, EDUCATION IN; MEDICAL AND SURGICAL EDUCATION; MINISTRY, EDUCATION OF; PHARMACEUTICAL EDUCATION; TEACHERS, TRAINING OF; Also treated under articles on the separate national systems, e.g. FRANCE, EDUCATION IN; GERMANY, EDUCATION IN, etc.

Examinations mentioned up to this point have been qualifying tests to ascertain whether a candidate has reached a definite standard. A further extension of this is the competitive examination by which candidates are not only required to attain a standard, but are arranged in order of merit, on the basis of which rewards, prizes, scholarships, or appointments are awarded. The most common use of this type of examination is to fill positions in government or municipal service. Civil service examinations, however, have been established comparatively within recent years in most countries. (See further PUBLIC SERVICE, EDUCATION FOR.) The competitive system is also used in most countries to secure places in the government institutions which prepare for the respective armies and navies. (See MILITARY EDUCATION; NAVAL EDUCATION.) Scholarships (q.v.), exhibitions (q.v.), fellowships, and other academic prizes are also awarded by some form of competition.

But it has always been in connection with the work of the school that examinations have been most frequently employed.

Here they may be used periodically as part of the class-room routine to test the amount of knowledge retained by the pupil in a certain field (see REVIEW EXAMINATIONS), or at stated intervals to test the ability of pupils to proceed to more advanced work (see GRADING AND PROMOTION). In both cases, however, the work of examining is entrusted in most instances to the teacher who has charge of the class, or else is conducted by the principal of the school, when the examination is as much a test of the teacher as of the pupils. Examinations conducted by external bodies have been employed for various purposes, (1) by state authorities to test the quality of work done by schools as a basis for the payment of grants. This pernicious system prevailed in English elementary education for many years, and is still the basis of payment in Ireland for secondary education. (See APPORTIONMENT OF FUNDS); (2) by state or other authorities, e.g. universities, professional associations, etc., as a test of the ability of pupils who are leaving the secondary school, to enter on higher studies or merely as a test of the knowledge already acquired. Under this type of examinations (q.v.)., school leaving examinations, as for example Abiturientenprufung(q.v., and GERMANY, EDUCATION IN), and the baccalaureate (see FRANCE, EDUCATION IN), Below a statement is given of the different examining bodies in England. In the United States there is a tendency at present to supersede such entrance examinations by a system of accrediting (q.v.), first introduced by the University of Michigan in 1871. (See COLLEGE ENTRANCE BOARDS; COLLEGE REQUIREMENTS

FOR ADMISSION.)

In Germany and America the tendency has been to limit the number of examinations so far as possible, and by building up a strong teaching profession and system of inspection to accept the decision of the teacher on the question whether pupils have attained required standards or not. In France every step in the educational progress is marked by some form of state examination. In England a system of inspection and better trained teachers has taken the place of examinations in elementary schools. But in secondary education a multiplicity of examining bodies still remains, and since England is typical of an extensive system of examinations, this is described below in some detail.

English System of School Examinations.-

The beginning of the method of examination, as we now understand the term, was in the sixteenth and seventeenth centuries, and is most clearly to be traced in the records of the Merchant Taylors' School, London. This school was founded in 1561, and in 1562 the first examination was held. It was a "solemn visitation" of the diocesan. Bishop Grindal and other learned men came to the school to examine "first the ushers and afterwards the forms." The ushers were questioned each as to his learning and his manner of teaching. Then the boys were questioned, form by form. The head master was Richard Mulcaster (q.v.), and the report of the examiners was commendatory on the whole, the only reserve being that the staff, being northern men born, had not taught the children to speak distinctly but

that some of the boys showed attainments equal to those of any school in the realm, "which gratifying intelligence was quickly conveyed to Mulcaster, then lying sick, and was received by him with cheerfulness and gratitude." In 1564 Grindal again appeared, accompanied by Dean Nowell and other learned men. A boy named King gave before them a pithy and eloquent oration. Other boys presented verses, and then began the oppositions of the chief four forms and an examination of the three ushers. The proceedings lasted from eight in the morning till five in the afternoon, with an interval for "a repast." These visitations or examinations were made usually once a year. In 1572 there appeared the Bishop of Winchester with Dean Nowell and again "other learned men," and the examination was more searching and comprehensive than hitherto. Before a considerable gathering of "venerable" men "the head scholars of the school presented themselves for examinations; and after one had briefly enumerated the several books they were learning in Latin, Greek, and Hebrew, Nowell began the examination by directing the lowest of that form to declare the sense and construction of a particular ode of Horace, which from one to another he prosecuted through the whole number, until the captain, requiring diversity of phrases and variety of words and finally omitting nothing which might seem needful for the trial of their learning in the Latin tongue. After him Watts (Archbishop of Middlesex) examined the same boys in Homer as to their skill in Greek, which was his favorite language, and Horne tried them in the Hebrew Psalter.

In all which exercises, they were well allowed. " Dean Goodman (founder of the Ruthven Free School, 1595) then examined the next form in Cicero's Tusculan Disputations. It was customary to elect, from the knowledge shown by the scholars on these occasions, scholars for St. John's College, Oxford. In 1586, Mulcaster resigned the headmastership, but in 1602 he again appeared at Marchant Taylor's School but, as one of the examiners assisting Dean (afterwards Bishop) Lancelot Andrews, and took part in the"appositions." Then the four principal scholars pronounced orations, the captain and the second scholar in Greek, the third and fourth scholars in Latin. Mr. Gwyn (Doctor of Physic), one of the examiners, made a learned answer to the captain's oration. Sixteen of the principal scholars were then examined and a theme given them to write whilst the examiners went to dinner. Three scholars were then chosen for St. John's College, Oxford. In 1601, after forty years' work, the school statutes were revised and it was decided to recommend a "probation" of the school three times a year. This probation was to be made by the master. The testing was to last a day from half-past six in the morning till eleven, and from 12:30 till five o'clock in the afternoon. All forms were to be examined in writing. Precautions were to be taken against prompting and copying. No dialogue, epistle, theme, sentence, or verse was to be set twice in the same year. Ample time was to be given to all, but failure to do the exercises well (by any negligence or lack of ability) for these probations was to result in dismissal. A register of the school's probation was

to be kept, in it to be entered the name of each boy in each of the six forms, length of stay in the school, what books he had read and how far in them he had read, and a record of his exercises. A comparison was thus to be made, and a permanent record kept, of progress from Probation Day to Probation Day. The master and his three teachers were to receive 6s. 8d. each for their work in examining.

The governors of the "greatest school in England under one roof" committed the examination to the masters "without any association" with them of outside examiners; first because of their assured confidence in them; secondly, because the presence of strangers would hinder boys; thirdly, because, if a strange assembly were present, they would take off the master's attention as well as distract the minds of the boys. Thus the Visitation (q.v.) of the school by the Diocesan led first to oral examination by the bishop and other learned men, then to the probation by the headmaster and teachers themselves, to be reviewed by the bishop or visitor and the Court of Governors and their friends. The examinations were the preludes to the choice of scholars for the university. With the visiting of the examiners and the governors, there sprang up the idea of a school show day, the Declamation Day, as it was often called, to which governors, parents, and those interested in the school, either magnates or the public, came that all might rejoice together in the performances of the pupils. It will be seen that the plan of probation at Merchant Taylor's School embodies examinational ideas for which reformers have still to

plead to-day: confidence in the masters to conduct their own examinations, a style of examination devised to bring out active and initiative powers of pupils even more than to test mere retentive capacity, and work required in examination to be qualitative rather than quantitative. This latter feature is the more noticeable, seeing that the curricula of the schools in classics was so extensive. Perhaps the most remarkable point in the Merchant Taylor's scheme is the inclusion of the register of the school's probation. It is not improbable that this plan has the future with it. For it is a recognition of comparison not only of pupil with pupil, but of the ability of a pupil at one probation with his ability at the next and following probations. It is thus often material for considering the progress of abitity as well as the attainment of a standard of knowledge. It shows the power of using knowledge at entrance, and all along the line of the pupils' course, three times a year, and is an indication of educational process in the individual, instead of being mainly concerned with competitive merit and relative position in an order of merit according to some objective standard of attainment.

Examinations of school were required by the statutes of St. Saviours' Grammar School, 1562, Tonbridge, 1564, Oundle School, 1566, St. Albans, 1570, Sandwich, 1580, and Codwell (Herefordshire), 1612. The system was therefore established in schools by the time of the sailing of the Pilgrim Fathers.

It was not until the second half of the nineteenth century

that the examination system which marks English education received its fullest development, until at the present day the multiplication of examinations and examining bodies has given rise to a situation which is leading to a reconsideration and reform of the system. But whatever arguments may be adduced in favor of or against examinations, this much may be said by way of preface, that English education could never have reached the present state of development without the influence of the system, pernicious and exaggerated as that may have been. Both in elementary and secondary education the examinations helped to standardize schools and curricula; they introduced new branches of study, and kept teachers, who would otherwise have been inefficient, to certain easily formulated and definite standards, however faulty and objectionable these may be in the light of later educational theory.

Elementary education was submitted to the controlling influence of examinations by the action of the Rt. Hon. Robert Lowe, who in 1861 introduced payments by results as the most mechanical and ready method of measuring efficiency. All children over six years of age in the elementary schools were to be examined individually once a year in the three R's, standards being arranged according to age. Government grants were paid according to the results and tendencies. A minimum of education was thus secured to children of all abilities, but a monotonous uniformity was introduced. Teachers were not only stimulated by the prospects of the grant, but were placed at the mercy of

local managers to whom the grants were directly paid. The system made every pupil rate perfect in the three R's. One inspector even went so far as to say that "the studies of the classroom must be those wherein progress can be definitely measured by examinations." Another inspector, in dictating out of a reader which had been used by the school, changed some of the words, but found on marking the papers that the pupils had not noticed his changes, and evidently had learned the book by heart. Great care was taken by managers and teachers to make a good showing on the day of inspection; the premises received vigorous cleaning, and the children were strongly urged to appear with clean hands and faces and in their best clothes. The system did not continue without considerable opposition from those interested in education. Matthew Arnold (q.v.), himself an inspector, reports "That the mode of teaching in the primary school has fallen off in intelligence, spirit and inventiveness," owing to the introduction of the mechanical processes. Slight modifications were made in the system; the amounts of the grants were altered; additional grants were given for "specific subjects" (geography, history, algebra, geometry, and any other scheme of work approved by the inspector); examinations of Standards 1 and 11 were abolished in 1873 and 1874. The Royal Education Commission of 1886-1888 recognized that some doubt was expressed whether the system of examinations fosters a healthy feeling, and was inclined to believe that overpressure both of teachers and pupils was caused. The majority held that "so long as a money value is

attached to each success in the individual examination of the children attending any elementary school, and so long as the teachers are dependent on the grant for part of their income, there is great risk that teachers, in considering their own reputation and emoluments, may endanger the health and welfare of the children." In the same period an agitation was conducted in the press (see Nineteenth Century, November, 1888, and February, 1889) on the whole question of examinations, and Mr. Auberon Herbert published a collection of letters under the title The Sacrifice of Education of Examination (London, 1889). As a result individual examinations were abolished in 1890, and "examination by sample " was introduced, by which the inspectors could examine different subjects. In 1895 inspectors could visit schools without previous notice. By 1897 the system of payment by results was abolished, and with it the system of wholesale examinations at the hands of the government.

A similar system of examinations and payment of grants on the results was employed by the Science and Art Department, which made payments to schools for pupils winning prizes; at first only six subjects were offered for examination, and this number was gradually raised to twenty-six. Elementary school teachers qualified themselves by obtaining the department certificate, and by teaching science subjects in the evening were able to secure the grant. The system encouraged the rise of schools of science and the teaching of science and art subjects in secondary schools. Payments by results were abolished by the Department in 1895.

In the two systems so far mentioned there was at any rate a certain amount of uniformity in standards of requirements and in organization. But it was in the field of secondary education that the tyranny of examinations and examining boards with different standards, requirements, organization, and dates was felt. In 1853 the College of Preceptors (q.v.) began a system of examinations in secondary school subjects (Latin, French, English, history, mathematics, geography, drawing, some science, and Greek.) The examination was open to both boys and girls, and certificates were given on the results. The examinations were held twice a year at local centers. In 1858 the Society of Arts, which in 1852 had formed a union of mechanics' institutes, proposed to hold examinations of persons over fifteen years of age on leaving school in mathematics, English, history, Latin, French, and German; in 1873 technological examinations were added, but were transferred in 1879 to the City and Guilds of London Institute. In 1858 Oxford undertook the examination of pupils in secondary schools through a body of delegates, and gave the degree of Associate of Arts to successful candidates; girls were admitted in 1870. Cambridge also instituted a system of examinations for boys only in 1858, and extended it to girls, who were allowed to take the papers in 1863, and in 1865 were placed on the same footing as boys. Preliminary sections for pupils under fourteen were also instituted. Centers were established not only all over Great Britain and Ireland, but also in the colonies. The two universities held their examin-

ations at different times of the year. When in 1869 there seemed a possibility that a government examination would be established for secondary schools, as a result of the Endowed Schools Act, the headmasters at their conference in 1870 urged the universities to take up the work and to grant leaving certificates which would exempt from entrance examinations to the universities. The result was the establishment of the Oxford and Cambridge Schools Examination Board, or the Joint Board, in 1873. Girls were admitted to the examination in 1878, and in 1882 a junior certificate examination was instituted, the papers were marked by the masters of the schools, and were reported on by the examiners. London University held its first examination in 1838, which included arithmetic and algebra, English history, geography, Greek, Latin, chemistry, natural history, geometry, and classical history. Students took first the pass papers and then honors. At first the examination was limited to students in affiliated colleges of the university, but in 1858 was thrown open. This examination continued to increase in difficulty, and complaints were heard from schools until the requirements were revised in 1898. When the University of London, by act of 1898, again became a teaching institution, the external examinations for external students were retained. Local examinations are also conducted by Durham, Birmingham, Manchester, Liverpool, Leeds, and Sheffield universities, the last four being combined as a Joint Matriculation Board. The University of Wales and the Central Welsh Board also hold exam-

inations for matriculation and leaving certificates. Other examining boards are the London Chamber of Commerce, the City and Guilds Technical College, and the Lancashire and Cheshire Institute, which are concerned mainly with examinations in technical and scientific subjects. This does not exhaust the list of examinations or examining bodies; Oxford and Cambridge in many cases insist on candidates passing either in whole or in part the Responsions and Previous Examinaions, which their colleges may insist on an additional matriculation examination. Further, none of the above examinations usually count anything toward scholarships or prizes, nor toward the examinations for entrance into the training schools for the army, navy, (Woolwich, Sandhurst, Osborne) or into the civil service. The different branches of the public services have their own entrance examinations, which have led to the establishment of numerous "cramming" institutions. One of the evils of the examinations for the lower branches of the civil service is that boys and girls tend to leave the regular secondary schools for the crammer.

It is only within recent years that exemptions have been accepted by professional bodies, by which a certificate of success in any of the recognized university examinations is accepted in lieu of their own preliminary examinations. But many of them still provide their own examinations. Among these may be mentioned: the Institute of Chartered Accountants; the Society of Incorporated Accountants and Auditors; the Institute of Actuaries; the Royal Institute of British Architects; the Institution of Civil Engineers; the Law Society; the General

Medical Councils; the Pharmaceutical Society of Great Britain, etc.

The evils of over examination are, however, beginning to be slowly recognized. In 1903 the Consultative Committee of the Board of Education recommended, after conferences with several associations representing teachers, the establishment of a representative central board to coordinate and control standard of examinations and to secure the interrecognition of certificates. (See Board of Education, Circular, July 12, 1904.) Inspection, both by universities and by the government, is gradually increasing in extent and importance. Universities are cooperating with each other and combining to reduce the multiplicity of entrance and preliminary examinations, and professional bodies are recognizing equivalents and granting exemptions in these. The external examinations and their attendant evils are supplemented by the number of examinations held within the schools by the teachers. Each term is concluded by an examination in all the work immediately preceding. Promotions from one class or form to another depend on the results of the term examination. Increasing attention, however, is being drawn to the importance of relying on the teachers' testimony on a pupil's work and on the pupil's record in the classroom rather than on the results of an examination, which may be vitiated through several causes.

The advantages and disadvantages of examinations have been frequently discussed, and several points stand out clearly.

That they are hygienically harmful to the majority of pupils is shown in detail in the following article (EXAMINATIONS, HYGIENE OF). The limitations of the English system of elementary education were eloquent proof that examinations do not constitute a satisfactory basis for the distribution of money grants to schools, nor do they secure the results which are aimed at - general educational efficiency (see APPORTIONMENT OF FUNDS). Examinations cannot provide the best kind of motives for study, and do not secure the proper type of interest in school work; The stimuli afforded are adventitious and artificial. Too many accidental conditions may enter into examinations which may counteract their value as tests. Further, an examination over a large area cannot be addressed to the individual. Frequently success in examinations may be due, not to innate general ability, but merely to retentive powers. Above all, external examinations disorganize school work and tend to limit the good teacher and to reduce all teaching to a dead level of uniformity, and in most cases must result in cramming. That the evils which follow in the train of competitive examinations for public service appointments are less harmful than the old system of nomination by political influence is obvious; but another question arises, whether national efficiency is secured by the present means. There is a tendency in England at present to introduce more widely a system of oral examinations such as has been employed recently by the Admiralty to secure officers for the navy, and by the West Riding Council in the award of Scholarships.

The whole question of whether success in examinations is followed by success in after-life is one that thas never been submitted to scientific investigation. F.W.&I.L.K.

On the use of examinations as a classroom procedure for review, see REVIEW EXAMINAIONS; METHOD; RECITATION.

EXAMINATIONS, HYGIENE OF.-In recent years there has been a strong movement for the abolition, or at least the limitation, of school examinations on account of the many evils, hygienic and pedagogical, that seem to be inevitably connected with such tests. There seems to be, however, a fairly general consensus of opinion that examinations of some kind are necessary, and hence the hygienic aspects of the subject are of special importance.

Hygiene is concerned both with the direct results of examination in their bearing upon the health, and also with certain secondary and indirect results of examination. The data in regard to the direct effect have accumulated in great abundance. Examinations are often the cause of overpressure, and serious physical disorder is not infrequently produced by the strain of preparation and of performance. Especially in England, Germany, and other European countries has this been the case. Studies in Russia, where examinations often extend over a period of several weeks, have shown loss of weight and other indications of physical strain in pupils at such periods. In Germany fear of examination has been found to be frequently one of the causes of suicide among school children.

In this country we have no results of special investigations concerning the effect of examination on the health of school children, but the reports of innumerable observers show that frequently there is dangerous nervous strain; and that even the best students often cram before examinations in an unhygienic manner will be hardly denied by any who are young enough to recall their own student days. In great universities in this country the writer has seen mature students of industrious habits become more or less abnormal, not to say pathological, in their mental activity on the eve of examination, and exhibit the phenomena of over-fatigue during the examination itself. The pressure of examination is likely to fall hardest on those who least need the stimulus, and instances of overwork before examination are not rare among the best students. Considering the matter from the standpoint of psychology, such violent mental athletics are both wasteful and injurious. Modern psychology and psychiatry make plain the need of regularity in intellectual work and the danger of any kind of abnormal mental activity. The unnatural method of study on the part of the examinee of which the protestants in the Nineteenth Century complained is all too prevalent in this country. The evil here may be less in degree, but it is of the same kind.

There are, besides, certain secondary results of examination which are distinctly evil, as they tend to produce habits of unnatural and disorderly thinking. Some of these are illustrated by experimental studies that have been made in Germany.

Lobsien has made interesting experiments on the psychology of school examinations. He wrote on a blackboard twenty simple examples in arithmetic. Fifty-four boys of the age of eight were tested by him. The experiment was made twice. The test of normal conditions was similar to an ordinary study hour in arithmetic with silent reckoning. Before the beginning of the special test the children were told that their work would be considered as an examination and as the basis for their marks. The result was as follows: with the normal test there were 39 per cent of the examples wrong; with the special test 50 per cent. The effect of the examination was to cause confusion of association and error. Lobsien made also a similar test with dictation exercises. The results corroborated those of the first experiment. In all cases the examination injured the character of the performance, and especially in the case of the poor pupils. Lobsien extended this experiment also to the qualitative errors. The greatest number of errors, namely, 42.7 percent, occurred in cases of words which came under definite rules. Plecher has more recently made experiments to test the results found by Lobsien, although without testing the character of the errors, and has found similar injurious results. Indications of emotional strain were also found. That these conditions of anxiety were actually present was proved by an experiment which Plecher performed with thirty-eight children twelve years of age in a class of Sexta of the common school. Some days after the official examination at the close of the year, he had the pupils prepare a so-called

free essay in regard to school examinations. Of thirty boys, twenty-nine testified to the presence of a feeling of anxiety, of course in the most varied forms of expression: "I do not trust myself to speak"; "I am glad of the examination, but when the Herr Oberlehrer comes, I am afraid"; "If I reckon, for example, two hours, I quite lose my senses." One pupil wrote, "If it is stated that we have an examination to-day, then a great dread comes over me, because I always think I shall do everything wrong. The thought always keeps working in me, and then with the best of will, I can do nothing. When we are through, then the anxiety no longer remains."

Equally bad, perhaps, are the habits of study fostered by preparation for examination. It is a mere commonplace to say that in many schools the best preparation for an examination is to have in memory a vast number of details. The student may enter the examination in such a condition of brain fatigue that he would find it difficult to solve a simple original problem; but if he have this plethoric memory of details he will succeed. A good memory, as Helvetius said, is a phenomenon of order. The normal mind, like the good householder, has its possessions stored away in various closets, drawers, and pigeonholes, or, in technical terms, in various association complexes; the student prepared for examination is like the unfortunate man who must move at a sudden alarm and has all his goods piled together at the street door ready for the truckman. Normally much of our knowledge is unconscious. Even what we cannot remember is

not wholly lost. Ebbinghaus in his experiments in memorizing nonsense syllables found that even where the memory of a series of syllables was so evanescent that after an hour it could not be recalled, a certain hidden skill persisted unconsciously, so that the same series could be relearned, even after the interval of a month, in much less time than a new series. Forgetting is a normal function of the mind. We retain comparatively little that we have learned, except main principles and this unconscious element. The latter, however, is valuable. It is this that makes us feel at home in a subject. At the end of a college course a large part of one's acquisition is of this kind; the ordinary examination cannot gauge it, but puts a premium upon abnormal mental activity.

Hygiene requires that examinations should be given for the sake of the students, and not in behalf of an institutional standard. Apart from examinations at graduation and the like, the chief reason for formal tests is to determine a pupil's fitness for doing profitably a higher grade of work. When this can be determined without examination, a formal test is unnecessary.

The famous German educator, Professor Paulsen, has enumerated the rules which should govern examinations from a pedagogical point of view. There is an almost equally good code of rules from the point of view of hygiene for avoiding the evil secondary results of examination. They are in part as follows: (a) Look for the positive acquisitions of the student. Examination as such has the opposite tendency - it gives prominence to the deficiencies. (b) Begin with easy, simple, definite

questions. The missing of a question and answer in the beginning frequently confuses and upsets the whole affair. (c) Treat errors and blunders in accordance with Galatians vi, 1: 'Brethren, if a man be overtaken in a fault, ye which are spiritual restore such an one in the spirit of meekness, considering thyself lest thou also be tempted.' (d) Do not forget for most men an examination does not afford a good opportunity to appear in a favorable light; for this reason subjoin, as occasion may require, addits addendis."

The special demands of hygiene in regard to examination may be summed up briefly and dogmatically as follows: (1) No formal written examination should be given in the school below the sixth grade. (2) Examinations below the high school should not be more than forty minutes in length, and in the high school they should not be more than one hour in length. In colleges, higher technical schools, and the like, no examination should last more than three hours. (3) Not more than one examination should be given on the same day in the public schools: and in the colleges and higher schools not more than one three-hour examination or two one-hour examinations should be given on the same day. (4) Periods of examination extending over several weeks, as in some European countries, should not be permitted. (5) The sanitary conditions of the examination room as regards adequate light, good ventilation, suitable temperature, and adequate humidity of the air should be always provided for. (6) Hygiene joins with pedagogy in emphasizing the advantages of examination questions which test ability and power of straightforward thinking

over examinations that put a premium on cramming, i.e. original problems, translations at sight, the writing of original themes, and the like. W. H. B.

Examinations

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EXAMINATION. The term "examination" (i. e. inspecting, weighing, and testing; from Lat. examen, the tongue of a balance) is used in the following article to denote a systematic test of knowledge, and of either special or general capacity or fitness, carried out under the authority of some public body.

1. History. - The oldest known system of examinations in history is that used in China for the selection of officers for the public service (c. 1115 B. C.). See CHINA; also W. A. P. Martin, The Lore of Cathay (1901), p. 311 et seq.; T. L. Bullock, "Competive Examinations in China" (Nineteenth Century, July 1894); and Etienne Zi, Pratique des Examens Litteraires en Chine (Shanghai, 1894). The abolition of this system was announced in 1906, and, as a partial substitute, it was decided to hold an annual examination in Peking of Chinese graduates educated abroad (Times, 22nd of October 1906).

The majority of examinations in western countries are derived from the university examinations of the middle ages. The first universities of Europe consisted of corporations of teachers and of students analogous to the trade gilds and merchant gilds of the time. In the trade gilds there were apprentices, companions, and masters. No one was admitted to mastership until he had served his apprenticeship (q. v.), nor, as a rule, until he had shown that he could accomplish a piece of work

to the satisfaction of the gild.

The object of the universities was to teach; and to the three classes established by the gild correspond roughly the scholar, the bachelor, or pupil-teacher (see Rashdall i. 209, note 2, and 221, note 5), and the master or doctor (two terms at first equivalent) who, having served his apprenticeship and passed a definite technical test, had received permission to teach. The early universities of Europe, being under the same religious authority and animated by the same philosophy, resembled each other very closely in curriculum and general organization and examinations, and by the authority of the emperor, or of the pope in most cases, the permission to teach granted by one university was valid in all (jus ubicunque docendi).

The earliest university examinations of which a description is available are those in civil and in canon law held at Bologna at a period subsequent to 1219. The student was admitted without examination as bachelor after from four to six years' study, and after from six to eight years" study became qualified as a candidate for the doctorate. He might obtain the doctorate in both branches of law in ten years (Rashdall i. 221-222).

The doctoral examination at Bologna in the 13th-14th centuries consisted of two parts - a private examination which was a real test, and a public one of a ceremonial character (conventus). The candidate first took an "oath that he had complied with all the statutable conditions that he would give no more than the statutable fees or entertainments to the rector himself, the doctor or his fellow-students, and that he would obey the rector."

He was then presented to the archdeacon of Bologna by one or more doctors, who were required to have satisfied themselves of his fitness by private examination. On the morning of the examination, after attending mass, he was assigned by one of the doctors of the assembled college two passages (puncta) in the civil or canon law, which he retired to his house to study, possibly with the assistance of the presenting doctor. Later in the day he gave a lecture on, or exposition of, the prepared passages, and was examined on them by two of the doctors appointed by the college. Other doctors might then put supplementary questions on law arising out of the passages, or might suggest objections to his answers. The vote of the doctors present was taken by ballot, and the fate of the candidate was determined by the majority. The successful candidate, who received the title of licentiate, was, on payment of a heavy fee and other expenses, permitted to proceed to the conventus or final public examination. This consisted in the delivery of a speech and the defence of a thesis on some point of law, selected by the candidate, against opponents selected from among the students. The successful candidate received from the archdeacon the formal "licence to teach" by the authority of the pope in the name of the Trinity, and was invested with the insignia of office. At Bologna, though not at Paris, the "permission to teach" soon became fictitious, only a small number of doctors being allowed to exercise the right of teaching in that university (Rashdall).

In the faculty of arts of Paris, towards the end of the 13th century, the system was already more complicated than at

Bologna. The baccalaureate, licentiateship, and mastership formed three distinct degrees. For admission to the baccalaureate a preliminary test or "Responsions" was first required, at which the candidate had to dispute in grammar or logic with a master. The examiners then inspected the certificates (*schedulae*) of residence and of having attended lectures in the prescribed subjects, and examined him in the contents of his books. The successful candidate was admitted to maintain a thesis against an opponent, a process called "determination" (see Rashdall i.443 et seq.), and as bachelor was then permitted to give "cursory" lectures. After five or six years from the date of beginning his studies (matriculation) and being twenty years of age (these conditions varied at different periods), a bachelor was permitted to present himself for the examination for the licentiateship, which was divided into two parts. The first part was conducted in private by the chancellor and four examiners (*temptatores in cameris*), and included an inquiry into the candidate's residence, attendance at lectures, and performance of exercises, as well as examination in prescribed books; those candidates adjudged worthy were admitted to the more important examination before the faculty, and names of successful candidates were sent to the chancellor in batches of eight or more at a time, arranged in order of merit. (The order of merit at the examination for the licentiateship existed in Paris till quite recently.) Each successful candidate was then required to maintain a thesis chosen b y himself (*quodlibetica*) in St. Julian's

church, and was finally submitted to a purely formal public examination (collatio) either the episcopal palace or the abbey of Ste. Genevieve, before receiving from the chancellor, in the name of the Trinity, the licence to incept or begin to teach in the faculty of arts. After some six months more the licentiate took part "in a peculiarly solemn disputation known as his 'Vespers,'" then gave his formal inaugural lecture or disputation before the faculty, and was received into the faculty as master. This last process was called "inception".

In discussing the value of medieval examination of the kind described, Paulsen (The German Universities (1906), p. 25) asserts that they were well adapted to increase a student's alertness, his power of comprehending new ideas, and his ability quickly and surely to assimilate them to his own, and that "they did more to enable (students) to grasp a subject than the mute and solitary reviewing and cramming of our modern examinations can possibly do." At their best they fulfilled precisely the technical purpose for which they were intended; they fully tested the capacity of the candidate to teach the subjects which he was required to teach in accordance with the methods which he was required to use. The limitations of the test were the limitations of the educational and philosophic ideals of the time, in which a dogmatic basis was presupposed to all knowledge and criticism was limited to the superstructure. At their worst, even with venal examiners (and additional fees were often offered as a bribe), Rashdall regards these examinations (at the end of the 13th century) as probably "less of a farce than the pass examinations

of Oxford and Cambridge almost within the memory of persons now living." It is, however, to be pointed out that the standard in Paris and elsewhere at a later date became scandalously low in some cases. In some universities the sons of nobles were regularly excused from certain examinations. At Cambridge in 1774 Fellow Commoners were examined with such precipitation to fulfil the formal requirements of the statutes that the ceremony was termed "huddling for a degree" (Jebb, Remarks upon the Present Mode of Education in the University of Cambridge, 4th, ed., 1774, p. 32). The last privileges of this kind were abolished at Cambridge by a grace passed on the 20th of March 1884.

In the medieval examinations described above we find most of the elements of our present examinations: certificates of previous study and good conduct, preparation of set-books, questioning on subjects not specially prepared, division of examinations into various parts, classification in order of merit, payment of fees, the presentation of a dissertation, and the defence and publication of a thesis (a term of which the meaning has now become extended).

The requirement to write answers to questions written or dictated, to satisfy a practical test (other than in teaching), and a clinical test in medicine, appear to be of later date.

W. W. Rouse Ball in his History of the Study of Mathematics at Cambridge (1889), p. 193, states that he can find no record of any European examinations by means of written papers earlier than those introduced by R. Bentley at Trinity College, Cambridge in 1702.

The medieval candidate for the doctorate in medicine, although required to have attended practice before presenting himself, discussed as his thesis a purely theoretical question, often semi-theological in character, of which as an extreme example may be quoted "whether Adam had a navel."

The competitive system was developed considerably at Louvain, and in the 15th century the candidates for the master-ship of arts were divided into three classes (rigorosi, honour-men; transibiles, pass-men; gratiosi, charity-passes), while a fourth, which was not published, contained the names of those who failed. In the 17th century the first class comprised the names of twelve, and the second, of twenty-four, candidates who were divided on the report of their teachers into classes before the examination, and finally arranged in order of merit by the examiners. (Vernulaeus, quoted by Sir W. Hamilton, Discussions, 1852; p.647; Rashdall, loc. cit. ii. 262). At the Cambridge tripos (as described by Jebb in 1774, REMARKS,&c., pp.20-31) the first twenty-four candidates were also selected by a preliminary test; they were then divided further into "wranglers" (the disputants, par excellence) and Senior Optimes, the next twelve on the list being called the Junior Optimes. These names have in the mathematics tripos survived the procedure. (The name Tripos is derived from the three-legged stool on which "an old bachelor," selected for the purpose, sat during his disputation with the senior bachelor of the year, who was required to propound two questions to him.)

The subjects in which the medieval universities examined were (I) those of the trivium and quadrivium in the faculty of arts; (II) theology; (III) medicine; and (IV) civil and canon law. The number of subjects in which examinations are held has since grown immensely. We can only sketch in outline the transformations of certain typical university systems of examinations.

At Oxford there is no record of a process of formal examination on books similar to that of Paris (Rashdall, ii. 442 et seq.), disputations being apparently the only test applied in its early history. Examinations were definitely introduced for the B.A. and M.A. degrees by Laud in 1636-1638 (Brodrick, History of Oxford, p.114), but the standard prescribed was so much beyond the actual requirements of later times that it may be doubted if it was enforced. The studies fell in the 18th century into an "abject state," from which they were first raised by a statute passed in 1800 (Report of Oxford University Commission of 1850-1852, p.60 et seq.), under which distinctions were first allotted to the ablest candidates for the bachelor's degree. Further changes were made in 1807 and 1825; and in 1830 a distinction was made between honours examinations of a more difficult character, at which successful candidates were divided into four classes, and pass examinations of an easier character. By the statutes of 1849 and 1858 an intermediate "Moderations" examination was instituted between the preliminary examination called "Responsions" and the final examination. Since 1850, although fresh subjects of examination have been

introduced, no considerable change of system has been made.

The bachelor's degree at Oxford tended from an early period to be postponed to an advanced stage of studies, while the requirements for the master's degree diminished until, in 1807, the examination for the M.A. was abolished. It is now awarded to bachelors of three years' standing on payment of a fee..

Cambridge in early times followed the example of Oxford, and here also the bachelor's degree became more and more important (Bass Mullinger, History of the University of Cambridge from 1535....,p.414), and the M.A. has been finally reduced to a mere formality, awarded on terms similar to those of the sister university. The standard of examinations was raised in Cambridge at an earlier date than at Oxford, and in the 18th century the tripos "established the reputation of Cambridge as a School of Mathematical Science." The school, however, produced few, if any, great mathematicians between Newton and George Green. It was only between 1830 and 1840 that the standard of the tripos became a high one. At Cambridge there is no intermediate examination between the"Previous Examination" (commonly called "Little-go"), which corresponds to Oxford "Responsions" or "Smalls" and the triposes and examinations for the"Poll" degree, which correspond to the Oxford final honours and pass examinations respectively. But most of the triposes have been divided into two parts, of which the second is not obligatory in order to obtain a degree. The "senior wrangler" was the first candidate in order of merit in the first part of the mathematical tripos. The abolition of

order of merit at this examination was decided on in 1906, and names of candidates appeared in this order for the last time in 1909.

At the Scottish universities the B.A. degree has become extinct, and the M.A., awarded on the results of examination, is the first degree in the faculty of arts.

"The incorporation of the university of London in 1836 marks an era in the history of examinations; the teaching and examining functions of a university were dissociated for the first time. Until 1858 the London examinations were open only to students in affiliated colleges, and the teachers had no share in the appointment of the examiners or in determining the curricula for examinations; in 1858 the examinations werethrown open to all comers, and no requirements were insisted on with regard to courses of study except for degrees in the faculty of medicine. The sole function of the university was to examine, and its examinations for matriculation and for degrees in arts and science were carried on by means of written papers not only in London but in many centers in the United Kingdon and the colonies. From the first the degrees were (unlike those of Oxford and Cambridge until 1871) open to all male persons without religious distinctions; and in 1878 they were opened to women. (Tripos examinations were thrown open to women at Cambridge by the grace of 24th Feb. 1881, and at Oxford women were admitted to examinations for honors by statute of 29th April 1884. Proposals to admit women to university degrees were rejected by Oxford and Cambridge in 1896

and 1897 respectively.)

The standard of difficulty set by the university of London was a high one, very much higher for its pass degrees than the corresponding standards at Oxford and Cambridge, while the standard for honours was equally high. In medicine the examinations were made both wider in range and more searching than those of any other examining body. But, for reasons dealt with below, great discontent was roused by the new system. In 1880 the Victoria University, Manchester, was established, in which teaching and examining were again untied; and in the universities since established, with the exception of the Royal University of Ireland (which was created in 1880 as an examining body on the model of London, but which was dissolved under the Irish Universities Act 1908, and replaced by the National University of Ireland and the Queen's University of Belfast), the precedent of Victoria has been followed. By an act passed in 1898, of which the provisions came into force in 1900, the university of London was reconstituted as a teaching university, although provisions was made for the continuance of the system of examinations by "external examiners" for "external students," together with"internal examinations"for"internal students," in which the teachers and the external examiners of the university are associated. The examinations in music and the final examinations in law and medicine are carried on (1910) both for "internal" and "external" students by "external" examiners only, who are, however, appointed on the recommendation of boards of studies consisting mainly

of London teachers.

At the university of Dublin, examinations have been maintained both for the B.A. and M.A. degrees and students may be admitted to the examinations in subjects other than divinity, law, medicine, and engineering without attendance at university courses.

The examinations of the newer universities, the Victoria University of Manchester, Birmingham, Liverpool, Leeds, Sheffield and Wales, are open only to students at these universities, and are conducted by the teachers in association with one or more external examiners for each subject. In some universities, e.g. Manchester, the M.A. degree is given after examination to students who have taken a pass, and without examination to those who have taken an honours degree.

The universities which have departed farthest from the medieval system of examinations, at any rate in appearance, are those of Germany. The baccalaureate has disappeared, but students cannot be matriculated without having passed the Abiturienten-examen (*see below), probably the most severe of all entrance examinations (foreign students may be exempted under certain conditions). The student desiring to proceed to the doctorate is free from examinations thereafter until he presents his thesis for the doctor's degree, when, if it is accepted he is submitted to a public oral examination not only in his principal subject (Hauptfach), but also as a rule in two or more collateral subjects (Nebenfacher). The doctor's degree does not give the right to teach in a faculty (venia legendi). To acquire

this a doctor must present a further thesis (Habilitationsschrift), and must deliver two lectures, one before the faculty, followed by a discussion (colloquium), the other in public; but these lectures "seem to be merely secondary and are tending to become so more and more"; "scientific productiveness is so sharply emphasized among the conditions for admission that it overshadows all the rest" (Paulsen, loc. p. 165).

In France the examination for the baccalaureate, though conducted in part by university examiners, has become a school-leaving examination (see below)* The licentiateship has been preserved in the faculties of arts, science and laws, and is in point of difficulty about equal to the pass degree examinations of the university of London, though differing in the nature of the tests. In the faculty of sciences, the three subjects of examination selected may, under a recent regulation, be taken separately. Until a few years ago the successful candidates at the licentiateship were arranged in order of merit. For the doctorate in the faculty of letters two theses must be submitted, of which the subject and plan must be approved by the faculty (until recently one of them was required to be written in Latin). Permission to print the theses is given by the rector or vice-rector after report from one or more professors and they are then discussed publicly by the faculty and the candidate (soutenance de these)

*'It should be mentioned that the professors of chemistry of a number of German, Austrian, and Swiss universities, have, by agreement, instituted an intermediate examination in that

subject which students are required to pass before beginning work on the doctoral thesis. The examination of the students is conducted by the teachers concerned.'

In this public discussion the "disputation" of the middle ages survives in its least changed form. The literary theses required by French universities are, as a rule, volumes of several hundred pages, and more important in character even than the German Habilitationsschrift. The possession of the doctorate is a sine qua non for eligibility to university chair, and to a lectureship in the university of Paris.

In the faculty of sciences a candidate for the doctorate may submit two theses, or else submit one thesis and undergo an oral examination.

For the doctorate in law, a thesis and two oral examinations are required.

In the faculty of medicine there is no licentiateship, but for the doctorate six examinations must be passed and a thesis submitted.

There is also a special doctorate, the "doctorat d' Université," awarded on a thesis and an oral examination; and there are diplomas (Diplomes d'Etudes supérieures) awarded on dissertations and examinations on subjects in philosophy, history, and geography, classics or modern languages, selected mainly by the candidate and approved by the faculty.

1. Professional Examinations. (a) Teaching. - University examinations for degrees having ceased to be used as technical tests of teaching capacity, new examinations have been devised

for this purpose. The test for German university teachers has been described above. For secondary teachers, W. von Humboldt instituted a special examination in 1810 (Paulsen, Gesch.des gelehrten Unterrichts, ii. pp.283 and 393), and an examination for primary teachers was instituted in Prussia in 1794.

In France there is a competitive examination for secondary teachers, the agrégation, originally established in 1766. Agrégés have a right to state employment and they alone can occupy the highest teaching post (chaire de professeur) in a state secondary school, other posts being open to licentiates. There are also examinations for primary teachers. The tests for teachers are different for the two sexes.

In England there is no obligatory test for secondary teachers. The universities and the College of Preceptors conduct examinations for teaching diplomas. The Board of Education holds special examinations (Preliminary Certificate examination and Certificate examination, &c.) for primary teachers.

(b) Medicine.--See MEDICAL EDUCATION

(c) Other Professions.--A system of professional examinations carried on by professional bodies, in some cases with legal sanction, was developed in England during the 19th century. Those in the following subjects are the most important: Accountancy (Institute of Charteres Accountants and Society of Accountants and Auditors), actuarial work (Institute of Actuaries), music (Royal Academy of Music, Royal College of Music, Trinity College of Music, Royal College of Organists, and the Incorporated Society of Musicians), pharmacy (Pharmaceutical Society),

plumbing (the Plumbers' Company), surveying (Surveyors' Institution), veterinary medicine (Royal College of Veterinary Surgeons), technical subjects, e.g. cottonspinning, dyeing, motor-manufacture (City & Guilds of London Institute), architecture (Royal Institute of British Architects), commercial subjects, shorthand (the Society of Arts and London Chamber of Commerce), engineering (Institutions of Civil Engineers, of Mechanical Engineers, and of Electrical Engineers).

3. School-leaving Examinations.- The faculty of arts in medieval universities covered secondary as well as higher education in the subjects concerned. The division in art subjects between secondary and university education has been drawn at different levels in different countries. Thus the first two years of the arts curriculum in English and American universities correspond, roughly speaking, to the last two years spent in a secondary school of Germany or France, and the continental "school-leaving examinations" correspond to the intermediate examinations of the newer English universities and to the pass examinations for the degree at Oxford and Cambridge (Mark Pattison, Suggestions on Academical Organization, 1868, p.238, and Matthew Arnold, Higher Schools and Universities in Germany, 1892, p.209).

A tabular summary is given (see Tables I,II,III,IV on pages 45 and 46, Encyclopaedia Britannica) of the requirements of the secondary school-leaving examinations of France, Prussia (for the nine-year secondary schools) and Scotland, and of the university of London.

There are in England a number of school examinations which,

under prescribed conditions, also serve as school-leaving examinations, and give entrance to certain universities, especially the Oxford and Cambridge local examinations (both established in 1858), and the examinations of the Oxford and Cambridge "Joint Board." A movement to reduce the number of entrance examinations and to secure uniformity in their standard was set on foot in 1901. In that year the General Medical Council communicated to the Board of Education a memorial on the subject from the Headmasters' Conference. The memorial was further communicated to various professional bodies concerned. Conferences were held by the consultative committee of the Board of Education in 1903, with representatives of the universities, the Headmasters' Conference, the Association of Head-Masters, the Association of Head-Mistresses, the College of Preceptors, the Private Schools' Association , and with representatives of professional bodies. The committee were of the opinion that a central board, consisting of representatives of the Board of Education and the different examining bodies, should be established, to co-ordinate and control the standards of the examinations, and to secure interchangeability of certificates, &c., as soon as a sufficient number of such bodies signified their willingness to be represented on the board. They recommended that the examination should be conducted by external and internal examiners, representing in each case the examining body and the school staff respectively, and that reports on the school work of candidates should be available for reference by the examiners (circular of the Board of Education of 12th of July 1904).

The "accrediting" system in the U nited States was started by the university of Michigan in 1871. A school desiring to be accredited is submitted to inspection without previous notice. If the inspection is satisfactory, the school is accredited by a university for from one to three years, and upon the favourable report of its principal any of its students are admitted to the university by which it has been accredited without any entrance examination. In practice it is found that many students whom their teachers refuse to certify are able to pass the university entrance examination. The statistics of nine years show that the standard of the certified students is higher than that of non-certified students. Two hundred and fifty schools are accredited by the university of Michigan. In 1904 it was stated that the system was gaining favour in the east, and that it had been adopted more or less by all the eastern colleges and universities with the exception of Harvard, Yale Princeton and Columbia.

4. Methods of Examination.-Examinations may test (i) knowledge, or, more exactly, the power of restating facts and arguments of a kind that may be learnt by rote; (ii) the power of doing something, e.g. of making a précis of written document, of writing a letter or a report on a particular subject with a particular object in view, of translating from or into a foreign language, of solving a mathematical problem, of criticizing a passage from a literary work, of writng an essay on a historical or literary subject with the aid of books in a library, of di-

agnosing the malady of a patient, of analyzing a chemical mixture or compound; and (the highest form under the rubric) of making an original contribution to learning or science as the result of personal investigation or experiment. Examinations are carried out at present by means of (1) written papers; (2) oral examinations; (3) practical, including in medicine clinical, tests; (4) theses; or a combination of these.

In written examinations the candidates are, as a rule, supplied with a number of printed questions, of which they must answer all, or a certain proportion, within a given time,varying, as a rule, from one and one-half hours to three hours, the latter being the duration most generally adopted for higher examinations in England. Whereas in France and Germany the questions are generally few in number and require long answers, showing constructive skill and mastery of the mother-tongue on the part of the candidates, such "essay-papers" are comparatively rare in England. In many subjects the written examinations test memory rather than capacity. It has been suggested that sets of questions to be answered in writing should as a rule be divided into two parts; (i) a number of questions requiring short answers and intended to test the range of the candidate's knowledge; (ii) questions requiring long answers, intended to test its depth, and the candidate's powers of co-ordination and reflection. A necessary condition for the application of the second kind of test is that time should be given for reflection and rewriting, say one-third or one-quarter of the whole time

allowed. A further distinction is important, especially in such subjects as mathematics or foreign languages, in which it is legitimate to ask what precise power on the part of a candidate the passing of an examination shall signify. Owing to a prevailing confusion between tests of memory and tests of capacity, the allowance for chance fairly applied to the former is apt to be unduly extended to the latter. In applying tests of memory, it may be legitimate to allow a candidate to pass who answers correctly from 30 to 50% of the questions; such an allowance if applied to a test of capacity, such as the performance of a sum in addition, the solution of triangles by means of trigonometrical tables, or the translation of an easy passage from a foreign language, appears to be irrational. A candidate who obtains only 50% of the marks in performing such operations cannot be regarded as being able to perform them; and, if the examination is to be treated as a test of his capacity to perform them, he should be rejected unless he obtains full marks, less a certain allowance (say 10, or at most 20%) in view of the more or less artificial conditions inherent in all examinations.

Oral. The oral examination is better suited than the written to discover the range of a candidate's knowledge; it also serves as a test of his powers of expression in his mother-tongue, or in a foreign language, and may be used (as in the examination for entrance to the Osborne Naval College) to test the important qualities (hardly tested in any other examination at present), readiness of wit, common-sense and nerve. It may be objected that candidates are heavily handicapped by nervousness in

oral examination, but this objection does not afford sufficient ground for rejecting the test, provided that it is supplemented by others. Oral tests are used almost invariably in medical examinations; and there is a growing tendency to make them compulsory in dealing with modern languages. Oral examinations are much more used abroad than in England, where the pupils during their school years receive but little exercise in the art of consecutive speaking.

Practical The laboratory examination may be used in subjects like physics, chemistry, geology, zoology, botany, anatomy, physiology, to test powers of manipulation and knowledge of experimental methods. In some cases (e.g. in certain honours examinations) the examination may be prolonged over one or more days, and may test higher powers of investigation. But such posers can only be fully tested by the performance of original work, under conditions difficult to fulfill in the examination room or laboratory. At the French examinations for the prix de Rome the candidates are required to execute a painting in a given number of days, under strict supervision (en loge)

In medicine the clinical examination of a patient is a test carried out under conditions more nearly approaching those of actual work than any other; and distinction in medical examinations is probably more often followed by distinction in after life than is the case in other examinations.

Thesis. For the doctor's degree (where this is not an honorary distinction) a thesis or dissertation is generally, though not invariably, required in England. Of recent years the thesis has

been introduced into lower examinations; it is required for the master's degree at London in the case of internal students, in subjects other than mathematics (1910); both at Oxford and London, the B.Sc. degree, and at Cambridge the B.A. degree, may be given for research, although the number of students proceeding to a degree in this way is at present relatively small. In certain of the honours B.A. and B. Sc. examinations at Manchester and Liverpool, candidates may take the written portion of the examination at the end of the second year's course of study and submit a dissertation at the end of the third year. Theses are generally examined by two or more specialists.

5. Competitive Examinations.-T he arrangement of students in order of merit led naturally to the use of examinations not only as a qualifying but also as a selective test, and to the offering of money prizes (including exhibitions, scholarships and fellowships) on the results. In 1854 selection by examination as a method of appointment to posts in the English public service was first substituted for the patronage system, which had caused grave dissatisfaction (see Macaulay's speech on the subject, The Times of the 25th of June 1853). The first public competitive examination for the Royal Military Academy, Woolwich, took place in 1855, and in 1870 the principle of open competition for the Royal Military Academy, Woolwich, took place in 1855, and in 1870 the principle of open competition for the civil service was adopted as a general rule. (For further details see CIVIL SERVICE.)

In the Wurttemberg civil service candidates are admitted to

a year's probation after passing a theoretical examination, at the conclusion of which they must pass an examination of a more practical character (A. Herbert, Sacrifice of Education...,1889 p.111).

In the award of scholarships, &c., it should be definitely decided whether the scholarship is to be awarded (1) for attainment, in which case the examination-test pure and simple may suffice, or (2) for promise, in which case personal information and a curriculum vitae are necessary. To take a simple instance; a candidate partly educated in Germany may obtain more marks in German at a scholarship examinationthan another who is more gifted, but whose opportunities have been less; the question at once arises, are the examiners to take the circumstances of the candidate into account or not? It is understood that at the colleges of the older universities such circumstances are considered. It must again be decided whether the financial circumstancesof candidates are to be taken into account; are scholarships intended as prizes, or as a means of enabling poor students to obtain a university education? In some cases wealthy students have been known to return the emoluments of scholarships. In many universities of the United States there is a definite understanding that emoluments shall only be accepted by those needing them. It would not be difficult to ask candidates to make a confidential declaration on this subject on entrance and to establish in Great Britain a tradition similar to that of the United States, and steps in this direction have been taken both at Oxford and Cambridge (Lord Curzon of Kedleston,

Univeristy Reform, p.86).

A special allowance may be made for age. In certain scholarship examinations held formerly by the London County Council a percentage was added to the marks of each candidate proportionate to the number of months by which his age fell short of the maximum age for entry. The whole subject of entrance scholarships at English schools and universities, and especially their tendency to produce premature specialization, has recently been much discussed.

6. The Organization and Conduct of Examinations.-The organization and conduct of examinations,in such a way that each candidate shall be treated in precisely the same way as every other candidate, is a complex matter, especially where several thousand candidates are concerned. The greatest precautions must be taken to insure the secrecy of the examination papers before the examination, and the effective isolation of individual candidates during the examination. The supervision should be adequate to remove all temptationto copying. The hygienic conditions should be such as to reduce the strain to a minimum. The question of the mental fatigue produced by examinations has been studied by certain German observers, but has not yet been fully investigated.

7. Marking, Classification and Errors of Detail.-In applying a single test in a qualifying examinationit would be sufficient to mark candidates as passing or failing. But examinations consist as a rule of a number of tests, each one of which is complex; and a mark is recorded in respect of each test or por-

tion of a test in order to enable the examining body to estimate the performance, considered as a whole, of the candidate. At Oxford the marks are not numerical, but the papers are judged as of this or that supposed "class," and various degrees of merit are indicated by the symbols $\alpha\beta\gamma\delta$ to which the signs + or − may be prefixed, according as they are above or below a certain standard within each class. At Cambridge, numerical marks are used. The advantage of numerical marks is that they are more easily manipulated than symbols; the disadvantage, that they produce the false impression that merit can be estimated with mathematical accuracy. Professor F. Y. Edgeworth, in two papers on "The Statistics of EXaminations" and the "Element of Chance in Competitive Examinations" (Journal of the Royal Statistical Society, 1888 and 1890), has dealt with the subject, although on somewhat limited lines. His investigations show clearly that with candidates near the border-line of failure, which must necessarily be fixed at a given point (subject to certain allowances where more than one subject is considered), the element of chance necessarily enters largely into the question of pass and failure. The fact may be stated in this way:-the general efficiency of the test being granted, it is true to say that the large majority of those who passan examination will be superior in efficiency to those who fail; but a few of those who fail may be superior to a few of those who pass. These errors are not peculiar to the examination system, they are inherent in all human judgments. It is necessary to allow for them in considering the failure of an individual candidate as

an index inefficiency.

The element of chance, which prevails in the region on either side of the border between pass and failure, obviously prevails equally on either side of the border between "classes," where candidates are classified; it has been suggested by Dr. Schuster that numerical order should accompany classification so as to avoid the creation of an artificial gap between the last candidate in one class and the highest in the next. Edgeworth's objection to such an argument is that the number of uncertainties is far less when candidates are classed than when they are placed in ostensible order of merit.

The difficulties of comparison of marks are further complicated when students take different subjects and it is necessary to compare their merit by means of marks allotted by different examiners and added together. In a pass examination the question has to be considered how far, if at all, excellence in one subject shall compensate for deficiency in another, a question which is indeterminate until the precise object of the whole examination is formulated. In the competitive examination for the Indian civil service, places are allotted on the aggregate of marks obtained in a number of subjects selected by the candidates from a list of thirty-two. The successful candidates are compared a year later on the results of another examination in which there is again a choice, though a much more limited one. The order of merit in the two examinations is, as a rule, very different.

Two futher points may be noted. An examiner may have under-

estimated the time required to answer the questions which he has set; this will be obvious if with a large number of candidates (say 300 or 400) none approaches the maximum mark. In this case the maximum should be reduced. Again, it is gererally recognized to be undesirable to give marks for a smattering. In order to avoid this various devices are adopted. The simplest is to award a proportion of marks (say 10 to 15, or even 20%) for "general impression." In some examinations, unless say 20% or more marks are obtained for a particular subject, no credit is given for the paper in that subject. Latham (The Action of Examinations, 1877, p.490) describes other numerical adjustments used to meet this difficulty, especially that used in English civil service examinations are reduced so as to conform to a certain symmetrical "frequency-curve," of which the abscissae represent percentages of marks between definite limits and the ordinates the number of candidates obtaining marks between those limits. C. E. Fawsitt (The Education of the Examiner, Royal Philosophical Society of Glasgow, 1905) shows that frequency-curves deduced from actual investigation of class-marks are not symmetrical, but have two maxima corresponding to the performance of "non-workers" and of "workers." In pass examinations of a well-known character there is a maximum just beyond the pass mark, this being the point of efficiency at which many students aim.

8. The Object and Efficiency of Examinations, and their Indirect Effects.-In order to estimate the efficiency of an examination as a test, the precise question should be asked in each case--what is it intended to test? Much of the evil attributed

to, and resulting from, examinations is due to the fact that this question has not been definitely put, and that a test legitimate for certain purposes has been used for others to which it is unsuited. Examinations are suited in the first instance for the purpose for which they were originally designed in medieval universities-the test of technical and professional capacity; it has never been proposed to abolish qualifying examinations for doctors, pharmaceutical chemists, &c.; the tests applied are (or should be) direct tests of capacity carried out under conditions as nearly as possible like those of actual practice. If a student can auscultate correctly, or make up a prescription, at an examination, he will in all probability be able to do so in other circumstances.

Examinations as tests of the knowledge of isolated facts are necessarily of relatively small value, because the memory of such facts is transient; and memorization of a large number of facts for examination purposes is generally admitted to be specially transient; the "knowledge-test," considered apart from a test of capacity, is in fact not a test of permanent knowledge, but of the power of retaining facts for a length of time which it is impossible to estimate and which with some candidates extends over a few weeks only. When used as tests of "general culture," examinations, in the view of Paulsen, based on a study of German education, not only fail in their purpose, but tend to destroy the faculties which it is desired to develope (Geschichte des gelehrten Unterrichts, ii. 684 et weq.); to prepare ready answers to the numberless questions

which an examiner may ask on a large variety of subjects is to paralyse the natural and free activity of the mind (cf.A.C. Benson on the results of English secondary classical education, From a College Window,3rd ed., 1906, pp. 154-177). If pushed to its logical conclusion the view of Paulsen must, it is admitted, lead to the complete abandonment of examinations of tests of "knowlege" as distinguished from direct tests of capacity. Thus isolated questions on details of grammar would disappear from papers on the mother-tongue and on foreign languages, in which the test would consist mainly or entirely of composition and translation. Erudition would be tested by the power of writing, at leisure, a dissertation on some subject selected by the examiners or the candidate or, in the case of a teacher, by the delivery of a lecture on the subject. At the French agrégation candidates are given twenty-four hours for the preparation of a lecture of this kind. Such examinations would test the "skill in the manipulation of facts which is the true sign of a trained intelligence" (cf. K. Pearson, "The Function of Science in the Modern State," Ency.Brit.10th ed. xxxii. Prefatory essay). They might possibly be supplemented by easy oral examinations to test both range of knowledge and readiness of mind. But in the case of a pupil who had passed through a good secondary school it would be as safe to rely for supplementary information under this head on the testimony of his teachers, as it is to rely on their evidence with regard to the fundamental and all-important element on which no examination supplies direct information- personal character.

The main arguments of those opposed to the examination system may be summarized as follows: (i.) Examinations tend to destroy natural interests and exclude from the attention of the pupil all matters outside the purview of the examination (they would not do so if examinations were so limited in character that preparation therefor could absorb only a fraction of the pupils' time); (ii.) they tend to cultivate a personal judgment where no personal basis of judgment is possible (the argument, directed mainly against the Oxford essay system, applies not to examinations in general, but to the character of the subjects set for essays); (iii.) competitive examinations on the home and Indian civil services scheme tend to diffuse mental energy over too many subjects (but see (xviii.) below); (iv.) examinations, especially competitive examinations, tend to become more and more difficult, difficulty being confused with efficiency - this has shown itself with the Cambridge mathematical tripos, in which for years questions of increasing difficulty were set on relatively unimportant subjects, until the examination was reformed (reply: all examinations should be overhauled periodically); (v.) they tend to paralyse the powers of exposition, all statements of knowledge being thrown into a form suitable, not for an uninstructed person, but for one who already possesses it, the examiner (this tendency should be counteracted by definite training in composition); (vi.) the sample of knowledge and capacity yielded at an examination is frequently not a fair sample; it is liable to extreme variations in a favorable sense, if the candidate happens to have prepared the precise questions

asked; in an unfavourable sense, if the candidate is suffering from misfortune or from accidental ill-health, the latter, owing to the periodic function, occuring much more frequently in the case of women than of men-(the reform of examination methods may remove to a great extent the element of chance in questions set; in a competitive examination it is impossible to allow for ill-health; in a qualifying examination it is difficult to make any allowance unless the examination is definitely conducted in whole or in part by the teachers, and the past record of the candidate is taken into account (cf. Paulsen, The German Universities, pp.344-345);(vii.) examinations of several hundred candidates at a time cannot be rationally conducted so as to be equally fair to the individuality of all candidates; the individual test is the only complete one (it is admitted that examinations on a large scale necessarily involve a margin of error; but this error may be reduced to a minimum, especially by a combination of oral and practical with written work); (viii.) the multiplicity of school examination required for different reasons produces confusion in our secondary education (there is a growing tendency to admit equivalence of "school-leaving" and entrance examinations; thus entrance examinations of Oxford, Cambridge and London, and the Northern Universities Joint Board are interchangeable under certain conditions); (ix.) the multiplicity of examinations tends to "underselling" (the success of the London examinations in medicine proves that a high standard attracts candidates as well as a low one; possibly intermediate standards may be killed in the competition; it is by no means

obvious that a uniform system of examinations would conduce to efficiency); (x.) examinations produce physical damage to health, especially in the case of women-students (on the point more statistical evidence is needed; see, however Engelmann quoted by G. Stanley Hall, Adolescence, 1905, ii.588 et seq.); (xi.) examinations have in England mechanically cast the education of women into the same mould as that of men, without reference to the different social functions of the two sexes (the remedy is obvious); (xii.) it is unjustifiable to give a man a university position on the results of his performance in the examination room, a practice common in England though almost unknown on the continent; a just estimate of a man's powers in research or for teaching can only be properly based on his performance. The present system merely leads to the transmission of the sterile art of passing examinations. (At Oxford and Cambridge many fellowships are now awarded on the results of examination; it is sometimes stated, in defence of this system, that young men cannot be expected to carry out research in classics or philosophy.)

On the other hand, the defenders of examinations reply that (xiii.) examinations are necessary in order to test the efficiency of schools to which grants of public money are given (this argument has become somewhat out of date owing to the recent substitution of "inspection" for examination as a test of the efficiency of schools; a combination on inspection and examination is also sometimes used); (xiv.) they serve as a necessary incentive to steady and concentrated work (the reply made

to this is that the incentive is a bad one, and that with efficient teachers it is unnecessary); (xv.) they show both student and teacher where they have failed (unnecessary for efficient teachers); (xvi.) though possibly harmful to the highest class of men, they are good for the mass (reply: no system which damages the highest class of men is tolerable); (xvii.) they are indispensable as an impartial means of selecting men for the civil service; (xviii.) in a difficult examination like the first class civil service examination the qualities of quickness of comprehension, industry, concentration, power of rapidly passing from one subject to another, good health, are necessary for success,(the Oxford commissioners of 1852 reported that "the examinations have become the chief instruments not only for testing the proficiency of the students but also for stimulation and directing the studies of the place". Report, p.61) though not tested directly, and these qualities are valuable in any kind of work (this appears to be incontrovertible); (xix.) examination records show that success in examinations is generally followed by success in after-life, and the test is therefore efficient (it does not follow that certain rejected candidates may not be extremely efficient); (xx.) as a plea for purely "external examinations," teachers cannot be trusted to be impartial and it is better for a boy to "cram"than to curry favour with his teacher (Latham).

The brief comments in brackets, appended above to the arguments, merely indicate what has been said or can be said on the other side. It can scarcely be doubted that in spite of the

powerful objections that have been advanced against examinations, they are, in the view of the majority of English people, an indispensable element in the social organization of a highly specialized democratic state, which prefers to trust nearly all decisions to committees rather than to individuals. But in view of the extreme importance of the matter, and especially of the evidence that, for some cause or other (which may or may not be the examination system), intellectual interest and initiative seem to diminish in many cases very markedly during school and college life in England, the whole subject seems to call for a searching and impartial inquiry.

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EXAMINATIONS. Examinations have lately come very widely into use, and call for consideration at once as educational appliances and as tests of proficiency. Something answering to examinations must enter into all effectual instruction; for in order that the pupil may gain solid advantage it is not enough that what he ought to know should be put before him - as by giving him a book, or by making him listen to lectures - but we must also see that he gets hold of it and understands it aright; this is the function of examinations as appliances for education. They have, however, another use, that of tests or instruments for selection, and this purpose may clash with the educational purpose. But though the examiners may have one purpose primarily in view, and may lay down their scheme with special reference to it, we must bear in mind that the examination must act in both ways at once. Some sort of advantage must attend on success, or else candidates will not work for it; and, on the other hand, though an examination may only be intended to sift out the ablest, and pains may be taken to avoid giving any advantage to a particular sort of instruction, still it will be found that some particular course is most productive of marks, and this will come into favour.

The few notices which we find of examinations in old times relate to tests of qualifications for professions or crafts. We

gather from notices of contests between the universities and the medical corporations in London that students had to pass an examination, after going through their apprenticeship, before being allowed to practise. But we never find that an examination was the sole test; it was always attached to a prescribed course of study and service. The foundation deeds of old endowed schools sometimes contain a provision for an examination; the object of this seems to have been rather to ascertain that the teaching was satisfactory than to classify the boys, though sometimes prizes and emoluments were awarded by the examiners.

University examinations are found to take their origin from the "disputations" which appear very early in the history of universities. Dialectical discussion had entered largely into the higher education in classical times, and when the university of Bologna was incorporated as a school of law by the emperor Frederick I. in 1158, disputations soon came into use as exercises for degrees. The university of Paris, which was founded soon after, and which was a school of theology and of arts, adopted the same course; and the forms of these exercises for degrees have survived to the present time in Germany, and did not disappear in England until 1860.

A student who aimed at a degree, which formerly only the more distinguished did, acted three times as opponent to other candidates, and was in time admitted to keep his "Act". This performance began by his reading a Latin thesis, in which he maintained some position in disputation against a doctor in the faculty, as well as the above named opponents, and, in fact,

against all comers. The debate was carried on in syllogistic form; the presiding doctor eventually summed up the controversy, and usually passed a compliment on the disputant, which was the earliest form of university honours.

Academical degrees, in their origin, implied a title to teach, as is seen in the names of Doctor and Master. The notion of a university degree as a criterion of general cultivation is comparatively recent: the B. A. or first degree, which is now so important, was not known in the earliest times, and is not even now granted in the German universities. The disputations took wonderful hold of the popular mind in the Middle Ages. It may be supposed that students looked more to points that gave an opening for attack, or that might be ingeniously defended, than to the truth of the matter; and as the question would be settled by an appeal to the Bible or Aristotle, a habit of looking to authority was engendered. We may catch sight of analogous evils in the examination system; for under this the points that are most likely to yield questions are the most studied. The two plans are only different ways in which the student may make a display of the powers or the knowledge he has acquired. We may observe that disputations bring out "powers", such as ease of expression in Latin, quickness in logical fence, and fertility of resource, more adapted for "Arts" than for sciences....

The most important change in an educational direction was effected by the influence of Dr. Whewell in 1848. He introduced a compulsory examination of adequate length in the elementary subjects, especially elementary natural philosophy; this checked

the practice of reading "scraps" of the higher subjects. The old educational party aimed at turning out men in the most effective condition for the ordinary struggles of life, while a later party sought to turn out mathematicians to supply the demands of the scientific world....

It is found that some branches of study are better suited for examination than others....

Examinations, of course, tell us little directly about moral qualities; industry, indeed, they reward, but the work produced may have been done under the strong incentive of eagerness for success, or under compulsion, or in the absence of temptation, and under other circumstances the candidate's zeal may flag. Energy and tastes go far to make a man what he is, and of these examinations tell us nothing. A <u>course</u> of examinations tells something more as to steadiness of purpose and growth of mind than a single one, and a person who follows up an unusual kind of study - such as till lately natural science was - has probably a genuine taste for it....

Examinations are effective in three principal ways as regards education. First, they act as stimulants, partly by holding out the prospect of advantages of some sort, and partly by appealing to the combative spirit in human nature and the desire to excel....Hence competitive examinations should not be often repeated; a single comprehensive one at the end of a long course may do good, but it must not be kept always immediately in view.

Secondly, examinations serve as guides....

Thirdly, examinations oblige a person to be able to produce

his knowledge, and encourage him to bring it out in a terse and lucid style....

But examinations, even when well conducted, have ill as well as good effects. They destroy spontaneity. Nine young people out of ten may quite rightly be made to move in a good "regulation groove", but the tenth would be better for having room to expatiate....

Examinations, though good for boys, are bad for men. Those which deal with general education should not be continued beyond the age of 22. Professional examinations, or examinations in the highest parts of science, intended for those who mean to give their lives to study, must come later, but should be as little competitive as possible....

Now we come to Government competitive examinations, such as those for the army and civil service. The object of the system was twofold. First of all it was desired to get rid of patronage, with the solicitation and trouble attending it, and, secondly, to secure the ablest men which the situations can command....

The next class to be considered are "pass examinations". These are important from the large number of men they affect. By a pass examination we mean one in which the leading object is to ensure a certain standard.... The objects of a pass examination are to sift out incapacity, and to ascertain that the candidates have gone through a certain process of education. The pass examinations of universities, both in England and in France, were until lately framed on a wrong principle. It was thought

that the examinations should comprise a specimen of every kind of knowledge that an educated man should possess. If the graduate should prove ignorant of any such branch, the university, it was thought, could absolve itself from responsibility by showing that he had known it at one time. Now, however, we recognize the fact that these scraps of knowledge soon disappear. The portion of chemistry or history which the candidate has passed in is often only so much "book" learnt almost by heart; with those who do really well the case is different....

Essays may be used in examinations in two ways. Subjects of a general nature, like a maxim or topic of the day, may be proposed, in which case readiness and fertility of ideas are tested, but a kind of superficiality and glibness is engendered; or the student may be required to write on some subject belonging to his course. The classical student, for instance, might write on a point of Greek history. A dissertation written at leisure is an excellent means of judging of qualifications, and may be used for those who are past the proper age for examination....

Out of 1000 young men who come to a university with a view of taking a degree, we find from experience that, roughly speaking, the following proportions will hold good: -250 will have both good abilities and the requisite power of will, and will take creditable honours: about 200 more will be comparatively weak in one or other of these qualifications, but may still get a place in an honour school or tripos; the next 150 will be the more vigorous pass men, who will show intelligence in subjects of but moderate difficulty, will enter keenly into the life of

the place, and will pass their examinations respectably; 200 more will pass without failure; the 100 that follow will meet with failures more or less frequently; and the remaining 100 will never pass any university examination at all. Some of these last instances may almost be regarded as cases of disease, arising from infirmity of will or the want of the power to fix the attention. Neglect of the early acquisition of good mental habits is the cause of many failures. A youth may be rejected once from love of amusement or from underrating the examination, but he does not fail again if he can help it. A second failure shows moral or intellectual incapacity.

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Copied verbatim from THE METHODOLOGY OF ED. RESEARCH BY GOOD-BARR-SCATES.

Perhaps the commonest example of normative-survey research in education is survey testing. By survey testing is meant simply the testing of a group of children (or adults) to ascertain the prevailing condition with respect to the traits measured by the test. A teacher may give tests to the pupils in her class to discover the general level of the class performance. Similarly, tests may be given to the pupils in a school building, in a city, county, state, group of states, or larger area, and some testing surveys have been international. The primary purpose of such testing is not to reveal detailed facts about any particular person individually, as in the case study, but rather to indicate the prevailing conditions throughout the group. It is true that diagnostic and prognostic uses of tests emphasize

study of the performances of individuals. To be considered research, survey testing, of course, must be conducted with reference to some clearly defined problem, such as the common errors of pupils in a particular school subject at a given grade level.

In discussing survey testing, various uses will be described without thought of suggesting that these are normally undertaken as research projects. These uses are mentioned to bring out the breadth of the applications of survey testing, and to suggest the wide field in which research may be undertaken. The student who is contemplating research in this area may choose any suitable aspect of the field for investigation, including practical use as a data-collecting instrument in seeking an answer to some significant question, or actual study of the tests themselves (characteristics, construction, or method of administering). In addition to these uses of survey testing, one may employ tests to furnish measurements for some other method of research, such as experimental research.

Achievement testing. It is now somewhat common for achievement tests to be given to entire school systems by some central agency, such as a bureau of research in the superintendant's office. Intelligence tests are frequently given by the same agency. A number of the larger school systems are constructing achievement tests of their own, based upon the courses of study which have been adopted for that particular system. The achievement-testing program of a central bureau may cover the same subjects and the same grades year after year, or variation from year to year may be provided in subjects, grades, or tests....

Achievement testing is called for in many different kinds of research.

Testing for appraisal. In the earlier testing literature, and even in that of more recent date, it has been stated that achievement tests could be used to appraise the work of teachers, of principals, and even of supervisors. Achievement test results are not to be ignored in judging the work of a teacher, but it must be realized that the teacher's influence is only one factor among many conditions which determine the level of the child's performance. For example, there are such additional sources of influence as native brightness, physical vigor, home background, recreational habits and environment, and previous training and experience - all contributing factors of great potency in determining the present performance of pupils. Unless one secures reliable and comprehensive evidence on these other sources of influence, he has little right to attribute test results to the superiority or inferiority of a particular teacher or group of teachers. Test results from a class may be taken as suggestive evidence of the quality of teaching, to be confirmed or refuted by other lines of evidence, but never to be used as the sole or even the principal criterion. One should, therefore, be careful in choosing research problems in this area, with intent of relying upon test results alone.

Some may consider the possibility of using test results as a means of rating different educational institutions.... It may be pointed out in advance of that discussion that the abilities which we measure by tests constitute only one of many sets of

desirable educational products; furthermore, we cannot be certain how large a part the school has played in the production of even these outcomes.

Not infrequently the results of city-wide survey testing are made available to principals and teachers for an analysis of their schools and classes. One must be cautious not to put survey tests to a more refined use than is appropriate. Although test makers have a general endeavored to construct tests that will yield reasonably accurate scores for an individual child, it must be understood that not every test - and particularly not every survey test - provides for a sufficient sampling of performance so that a single individual is reliably described....

State and regional achievement testing. There are a number of regular achievement testing projects that cover large areas, such as states, regions, or the country as a whole. Although these undertakings normally contemplate considerable use of the results for individual pupils, the projects, nevertheless, have obvious survey characteristics, and they are referred to here for that reason. In certain of the states achievement tests are given more or less regularly by the state department of education to schools throughout the state. Such practices in six of the states have been described by the Research Division of the National Education Association.

State testing programs especially for high schools are described by Segel....A number of states have testing programs for graduation from the eighth grade. These various state programs are usually conducted by bureaus of research or measure-

ment in the state department of education, in the department of education of the state universities, or in some teacher-training institution. In some cases the programs are carried on by a voluntary organization.

Several agencies conduct achievement testing on a national scale. The Bureau of Educational Measurements of the Kansas State Teachers College at Emporia conducts a "Nation-Wide Every Pupil Scholarship Test" in January and April of each year, which may extend over some forty-two states and involve around a million tests. This enterprise has been going on since 1925. The stated purpose of the project is "the promotion of scholarship." The Bureau makes its own tests for these occasions and supplies them to elementary and high schools that desire them for 1 1/2¢ and 2¢ apiece, respectively. Each school gives and scores its own tests and sends the results to the Bureau, which then calculates norms for the nation, and for many of the individual states, and returns these to the schools which participated so that they may compare their averages with the norms.

The Public School Publishing Co., of Bloomington, Ill., has also engaged in a nation-wide testing program annually since 1924, with possible follow-up tests later in the year; these programs embrace both elementary and high schools and are perhaps even more extensive than the Kansas project. In addition to these are three agencies which confine their attention to high-school pupils. College-entrance examinations have long been given on a national basis by the College Entrance Examination Board, but there are now other agencies, notably the Educational

Records Bureau of New York City and the Cooperative Test Service, which are interested in testing pupils in any grade of the high school.

It should be said that routine testing is not in itself research, whether it is on a national basis or in a single classroom. Reference has been made to these large testing programs because they represent procedures for gathering data which the normative-survey method employs; they may serve as a source of data for some one who desires to make use of their results for more analytical research purposes; and, finally, survey testing over considerable areas has become an important part of large-scale research undertakings which may include other kinds of investigation. Such surveys are often the inspiration for research studies. For example, H. A. Toops has made many researches from data gathered through the tests of the Ohio College Association. Numerous other similar examples can be found.

Achievement testing in school surveys. Survey testing of educational attainment has become a large and well-established part of school surveys. Caswell traces briefly the history of the use of tests in surveys. Whereas in 1911 the appraisal of instruction was based on an inspection of the teaching by a surveyor, achievement tests were given some recognition in a 1913 survey, and considerably more use was made of them in 1914 in the Butte, Montana, survey. In the Cleveland, Grand Rapids, and the St. Louis surveys of 1916 and 1917, under the influence of Charles H. Judd, achievement testing was raised to a height that has set a standard for all subsequent surveys.

Achievement testing is now a regular part of school surveys.

Testing in foreign countries. European countries, especially those on the continent, do not share the American attitude toward testing to any large degree. In general they are actuated by a different basic philosophy, which expresses itself in other interests. Intelligence tests are likely to be used where we would use achievement tests. There has, however, been a limited amount of investigation using achievement tests, and there has been some survey testing. Educational testing in England, France, Germany,and China has been summarized in the Review of Educational Research. The student who desires to get in touch with expressions of the European attitude at first hand will be interested in reading reports of international conferences on measurement. These diverse attitudes towards measurement should suggest a number of problems for investigation....

EXAMINATIONS

UNIVERSITY ADMINISTR ATION by Charles W. Eliot p. 52,53. Pub. 1908.

"All the instruction given in the University is thus liable to be inspected by visiting committees appointed by the Overseers; and the reports of these committees are made public, or kept private, at the discretion of the Board. The nature of the instruction in any department, and of the examinations held by any department, may thus be made the subject of a public report. It is of course difficult to obtain for all departments men, not menbers of the University's staff, who are competent to criticise the work of university teachers, particularly as the service of the Overseers themselves, and of all the committees that they appoint is gratuitous. Nevertheless, this function of inspection or examination has a high value, now in one department of the University and now in another. It checks accentricities, brings out defects, and signalizes merits. The Visiting Committees have authority to examine all question-papers prepared for university examinations, and all the papers written by students in answering those questions. Since at Harvard, as at the American universities in general, the instructors have charge of the examinations in the courses they have themselves given, this disinterested judgment of outsiders on the question-papers and answer-papers may at any time have a high value."

UNIVERSITY ADMINISTRATION by Charles W. Eliot p. 182.

"Written examinations lasting one, two, or three hours are held at intervals of about two months or oftener. If four examinations are held during the year, two of them may be three-hour examinations, and the other two one-hour. This method is open to the objection that the students may work hard only spasmodically, namely, shortly before each examination; the rest of the time they may be in a passive condition, more or less entertained and interested, perhaps, but not using their own minds actively on the subject. The method is good enough for courses of instruction which are intended to be only introductions to a thorough survey, or outline sketches of a great subject for persons who may, or may not, propose a systematic and thorough study of it."

UNIVERSITY ADMINISTR ATION by Charles W. Eliot p. 183, 184.

"A skilful and alert instructor can sometimes use the whole hour profitably for active discussion with the students before him, discussion in which the students themselves take the major part. If a portion of the hour be given to writing, the papers written should be corrected and graded by the instructor. The exercise should always afford the means of ascertaining whether each student in the course has been attending to the subject during the past week, or fortnight, and of marking or grading his work."

UNIVERSITY ADMINISTRATION by Charles W. Eliot p. 189, 190.

"In such subjects as anatomy, botany, and mineralogy, considerable quantities of material can be issued to each student

for careful examination and description, and at the end of two or three hours of such study a short quizz or oral examination may be used to advantage with a group of students who have been examining similar, but not the same, material."

UNIVERSITY ADMINISTRATION by Charles W. Eliot p. 206, 207, 208. Pub. 1908.

"Finally, university examinations have been greatly improved and systematized within the last fifty years, and have become a highly profitable part of university discipline. American experience on this subject is brief compared with English. The first written examinations ever held in Harvard University were introduced there in the year 1857 by two young tutors in mathematics. The written examination has since been studied from every possible point of view, and adopted in all departments of university work. They are much more than means of grading students and compelling the indifferent or careless student to do come work; they constitute a valuable means of training, inasmuch as they prepare young men to meet the similar crises which they constantly encounter in after-life, particularly in the professions, -both learned and scientific, -in the public service, and in business administration."

TESTS IN LIFE

"The professional man is constantly brought to tests much severer than any university examination can ever be. The lawyer must prepare himself, often under great difficulties, to plead his case on a given day. The physician may find himself

called at any moment to a sick or injured person, whose real condition he must discover as soon as possible, and must treat forthwith. He must also decide what to say to the patient, and to the patient's friends and relatives. He needs to have at his fingers' ends all the knowledge and skill applicable to the case in hand, and he needs it on a sudden. The architect finds it to his interest to present within a few weeks a design for a kind of structure which is not familiar to him, or which must be adapted to new conditions of construction and use. He must quickly summon all his forces, and work at high speed to produce within a few weeks an attractive competitive design. In all intellectual callings there are periods of intense labor to prepare for a crisis. For all such work the university examinations provide appropriate and invaluable training. On this account the disappearance of promotion and graduation examinations from many schools - both elementary and secondary - is greatly to be deplored; the more so because college and university examinations are sure to be lowered in standard when the students who enter the colleges and universities have had no experience in examinations prior to becoming members of their college or university on certificates from the secondary schools. A generation is growing up in many parts of the country which has successfully avoided examinations, having acquired the belief that examinations are an evil, instead of a profitable means of sound training."

UNIVERSITY ADMINISTRATION by Charles W. Eliot p. 208, 209.

"A peculiar form of examination which has been developed

in some university departments deserves mention. When an examination is to be held on a half-year's course in the differential calculus, for example, instead of preparing a question-paper containing eight or ten questions, the instructor responsible for the course prepares a set of forty or fifty questions which really cover the field of instruction in that course, so that any one who could answer all the questions would demonstrate that he had possessed himself of the substance of the instruction given during the half-year. This long paper is given to the students three or four weeks before the date of the examination. On the examination day the class is told to answer six or eight of the questions on the list. This method is analogous to the use of a full syllabus to define to a class at the beginning the professor's conception of the subjects he shall cover during the entire course which they are entering on. In any university there will be some departments in which this mode of examination can be occasionally adopted to advantage."

The following selection is copied verbatim from The New International Encyclopaedia , Second Edition, Vol. XXll, 1923 Pub. by Dodd, Mead, and Company, New York City. page 130

"Numerous acts of the English Parliament imposing religious tests upon persons in public office. The most famous are the Corporation Act of 1661 and the Test Act of 1693. The Corporation Act directed that all magistrates should take the oaths of allegiance and supremacy, as well as an oath renouncing the doctrine that it is lawful to take arms against the king, and provided that they must receive communion according to the rites of the Church of England. The Test Act, so called, imposed the like conditions on the holders of all public offices, civil and military, and obliged them in addition to abjure all belief in the doctrine of transubstantiation. Both of these acts were the result of the struggles against the Catholics in the reign of Charles II. They were repealed in 1828 as regards most of the provisions.

The New International Encyclopaedia Second Edition Vol XXII pub. in 1923 by Dodd, Mead, and Company, N. Y. C. page 414

"As early as 1877 Francis Galton suggested the use of the reaction experiment for the diagnosis of temperament. In connection with anthropological measurements of weight, height, eye color, and the like, he further developed a number of simple tests which he hoped would make it possible to "obtain a general knowledge of the capacities of a man by sinking shafts, as it were, at a few critical points.

In the early nineties of the past century mental tests came into prominence in America."

The following selection is copied verbatim from The Lincoln Library of Essential Information. Pub. by the Fronier Press

OCCUPATIONAL TESTS

"The army also had need of a system of classification whereby it could place men in the industrial activities which were necessary for carrying on the war. For example, some men were needed who were expert mechanics; some were needed to keep the army accounts. The locating of men suited to these lines of occupation could be effectively handled, in part, through a knowledge of the earlier occupations which the men had followed. In many instances, however, it was necessary to put men into lines of work which were different from those that had been familiar to them in civilian life, and tests were needed in order to avoid, so far as possible, misfit assignments. Fortunately the psychological methods for making such tests had been worked out in a great deal of detail in a number of centers before the war came. The psychologists of the country promptly came forward with the experience which they had accumulated in these earlier experiments and became an important part of the army organization. Special series of tests were devised by a number of commissions."

THE ARMY ALPHA TEST. This is the most extensively used of the army tests.

INTERPRETING RESULTS OF THE ALPHA TEST. page 1655

"The results of the army tests have been compiled by various writers in an effort to bring out the mental characteristics of the army recruits from different sections of the country and from different nationalities. One author has com-

piled the results of these tests in such a way as to show very definitely that the immigrants who come tot he United States from the southeastern European countries are not able to pass the test with as high a grade as the immigrants who come from the northern European states. In view of the fact that recent immigration has been predominantly from the countries in the southeastern part of Europe, these findings raise grave social questions.

Another general fact brought out by these tests is that the average recruit was able to answer the tests only about as well as school children between 13 and 14 years of age. On the basis of this fact, the statement is sometimes made that the average American citizen is intellectually between 13 and 14 years of age. Against this statement it has been argued that the tests include only those types of intellectual effort which belong to a school training.

Beyond 13 years of age the ordinary man does not continue to cultivate the same type of thinking which he cultivated in the school. Consequently, the test does not uncover the mental development which has been going on, for example, in business or in practical mechanics. There is nothing in the test to show what a man who works in a foundry has been learning since he left school.

Controversy as to the meaning of the test has arisen at another point also. There are some who regard the test as a measure of native ability, while others regard it as a measure of acquired information. If the test measures native ability,

then it is not to be expected that anyone who passes the test well at any given time will be of low mental ability at any other time in his life. Conversely, anyone who is not able to pass the test at a level that comports with his age cannot be expected to show intellectual ability of a higher order later. Those who believe that the test measures acquired information, on the other hand, interpret the results to mean that a man has had certain intellectual opportunities if he passes the test well, and that he has been deprived of those opportunities if he does not pass well.

It has been shown very clearly that the ability of recruits from different states parallels closely the efficiency of the school systems of these states. This fact would seem to indicate that the test measures school training quite as much as it does native intelligence. In general, this later conclusion is probably more nearly the exact truth than the statement that the test measures only native ability.

EXAMINING UNIVERSITIES. page 1662

There are also in England certain examining institutions. Thus the University of London is not altogether a teaching institution; it awards degrees to candidates who present themselves for examination after independent study in some particular field.

SCHOOLS IN OTHER COUNTRIES page 1662

The contrast which is to be drawn between Germany and England is expressed in the statement that the German school is a rigid and well organized system, with each part of the system clearly defined and distinct from the other branches. In

England adjustments are very much freer and less highly systematized. The success of the English school system depends upon the success of the examination system, which is organized with a view to permitting individual readjustments on a liberal scale.

EUROPEAN STATES.

Other countries have been dominated in their educational organization by the German and English examples in varying degrees. Those countries in which the influence of Germany has been most pronounced, such as Austria, Hungary, and the southeastern European states, have adopted the German system so far as their social and economic development would permit. Usually these countries have failed to reach a complete realization of the German ideals in education, but their systems have been modeled on the German plan.

BRITISH DOMINIONS. page 1663

The colonies of England, such as Canada, Australia, and South Africa, have developed an educational system modeled on the English plan. In many instances these school systems have secured their examinations from the examining boards of England, thus aiming to follow the standards set up in the mother country. The very freedom of the organization has, however, resulted in a departure both in standards and in exact form from the example of England. Thus, we find that in Canada the higher institutions have in some cases approached, in the form of their organization, the high schools of the United States, departing radically from the traditions of English organization of secondary schools. This departure from English models, however is not complete,

and there are many secondary schools in Canada which closely approach the English type. The Canadian high school is in some cases paid for entirely out of public funds, thus also departing from the practice of the English higher schools, which always charge a fee for admission.

METHODS OF COLLEGE ADMISSIONS. page 1672

Prior to the organization of the standardizing associations, the common practice of American colleges was to administer entrance examinations to all students passing from the secondary school into college. The entrance examination system came to this country from England, where it is the chief means of regulating the work of all educational institutions. It is still the dominant method of college admission in the states east of the Allegheny mountains. The University of Michigan, established in 1837, devised the method of admission by certificate, and thus broke away from the examination system of the older American institutions.

The theory on which the University of Michigan proceeded was that, as the highest institution of learning in the state, it had responsibilities which obligated it to provide through inspection and advice for the development, not only of its own courses, but also of the courses of the other institutions in the state. The University of Michigan, therefore, began to send members of its faculty to visit the high schools and encourage them in perfecting their methods of organization. When a student came from on of these inspected high schools he was received into the college as a satisfactory student, because the institu-

tion from which he came was known to conform to the requirements of the university. The certificate system has spread rapidly, especially in the Middle West and the West, and is today the accepted mode of college admission west of the Allegheny mountains.

In recent years the use of general intelligence tests has been advocated as a much better device than examination or certification to determine who shall pass from the high school into college. Elaborate studies have been made of the success with which the work of college students can be prognosticated on the basis of their school records, by entrance examinations in the particular subjects, or through general intelligence tests. It has been found that the school record and general intelligence tests are distinctly superior to examinations in particular subjects. General intelligence tests serve also to correct the estimate of the student based on his school record. The school record is determined in many instances by other considerations than native intelligence. Thus, an industrious student who is dull may sometimes make a better record than a bright student who is not attentive to his work. College officials have found it advantageous, therefore, in dealing with students, to collect the information supplementary to the school record, as a basis of the classification and administration of the school body.

Strang, Ruth. "Developments in Student Personnel Research" Teachers College RECORD, pp.120-133, Nov. 1933

"Selecting students who will fit the college has been, for many years and endeavor of college administrators, Even though the aim increasingly becomes 'to fit the college to the student,' the need remains for giving an individual some basis for predicting his probable success in a preferred curriculum.

"The first step has been to ascertain the relationship between intelligence test scores and college success, and between high school marks and college success. The superior predictive value of tests was indicated by some investigations, and that of records of high school achievement by others. Both these measures show a definite relation to success in college as measured by freshman marks. At Yale, for example, Crawford and Burnham found the high school record the most important single factor in the prediction of freshman scholarship....The wide variations in results are due to differences in the tests and in high school marking systems, and inthe higher institutions to admission policies, nature of student body, methods of instruction, etc.

"...Research in regard to selective admissions has been of value to the personnel worker in showing the degree of relationship that exists between scholastic success in college and such factors as intelligence test scores, teachers' marks in high school,ratings, college entrance board examinations, personality tests, subjects taken, and number of credits. It has also been of value in showing the lack of relationship that exists in a

certain percentage of cases even when the best criteria and combinations of criteria are used.

"...The large number of investigations of characteristics of students has revealed manifold differences in students and has pointed to the need of studying personality patterns instead of isolated traits. Investigators are still searching for an adequate method of studying 'the whole individual.'"

Spence, Ralph. "A Comprehensive Testing Program for Elementary Schools." Teachers College RECORD, pp.279-285, Jan. 1933.

"During the earlier years of test development, many schools were inclined to use tests in the uncritical way which is so often characteristic of the reception of a new discovery...

"It is clear from the above discussion that standardized tests are to be used for very definite purposes and with a realization of the values already available in teachers' marks and estimates. The test results should be insuch form as to permit ready use by the class-room teacher. Elaborate statistical manipulations cannot be expected. "...The important thing to remember is that the tests given are to serve definite educational ends. Start modestly with relatively few tests, and be sure that the possibilities of these are exhausted or that there are definite objectives not being met by the present testing program before others are added.

"When tests are used sporadically, they are likely to be expensive. In a school system of 1,000 children in Grades 1 to Vlll the total cost of the tests for the program outline would

be about $120 or 12 cents per pupil. Taking $75 as an average total expenditure per pupil in elementary school, this is not an expensive item. It would be difficult to find an equivalent expenditure which would yield greater returns."

Noll, Victor. "Measuring Scientific Thinking." Teachers College RECORD, pp. 685-694. May, 1934

"The purpose of the present article is to detail what is being accomplished to develop tests of scientific thinking which will be consistent with the points of view expressed in the previous articles. The six habits of thinking described in the first article provide the chief basis for this part of the work, as they do for the entire program. These habits are accuracy, suspended judgment, open-mindedness, intellectual honesty, criticalness, and the habit of looking for true cause and effect relationships....

"With such tests available it should not only be possible but practical to conduct experiments with school children in the teaching of scientific thinking....

"Scientific thinking <u>is</u> better thinking."

Hildreth, Gertrude. "Mental Ability Measured by Verbal and Non-Verbal Tests." Teachers College RECORD, pp. 134-144, Nov. 1932.

"The highly verbal nature of many intelligence tests is their most commonly criticized feature. This criticism is based on the wide-spread belief that facility in the use of symbols and language is only one kind of intelligence; that ability to deal satisfactorily with social situations or practical problems

indicates the possession of other kinds of intelligence. Tests involving reading and written responses test the former but not the latter capacities, it is claimed. A number of performance tests have been constructed for the sole purpose of measuring the abilities of pupils who have proved to be incapable when measured by verbal tests of mental ability...."

The following selection has been copied verbatim from the Journal of Educational Research, October, 1936. p.155.

Comprehensive Examinations in the Chicago Junior Colleges.

"Courses in English, composition, biological science, the humanities, physical science, and social science constitute the required portion of the curriculum of the three Chicago municipal junior colleges. The typical freshman studies English, composition, the first year of social science, biological science or physical science, and a number of elective courses. The typical sophomore enrolls in the humanities, biological science or physical science, the second year of social science, and several elective courses. The achievements of the students enrolled in the required courses named above are measured by comprehensive examinations prepared by the Department of Examinations, with the assistance of the faculties concerned. Each of these examinations is designed to cover one full year of study. The scores and marks are used in determining eligibility for graduation. They are also used to provide data on which to base recommendations of students to higher institutions, and to provide information useful in educational and vocational counseling. Ultimate-

ly, six comprehensive examinations, corresponding to the courses named will be given each semester. No examination for the second-year course in social science was necessary in June, 1935.

The following topics are considered in a report describing the 1935 examinations, prepared by M. D. Engelhart: (1) the preparation of the examinations; (2) the administration; (3) the scoring; (4) the D-score; (5) the assignment of letter grades; (6) the distributions of original scores, D-scores, and letter grades; (7) the reliability of the examinations; and (8) the analysis of the achievement of the "average" student. The report concludes with some inferences derived from the data and with some recommendations based upon these inferences."

"Iowa Testing Program.- For a long time a number of educational workers have felt the need of types of appraisal of instruction which give an adequate picture of what is being accomplished, which show deficiencies wherever they may exist, and which afford data that may readily be made the basis for a program of improvement. It is claimed that, under the direction of E. F. Lindquist and with the cooperation of the staff of the College of Education, University of Iowa, such a battery of tests has been developed."

"For the past eight years the College of Education and the Extension Division have provided a cooperative regional testing service known as the Every-Pupil Testing Program. One of the most important outgrowths of this experience has been the development of a comprehensive battery of tests of the basic skills in reading, study, language, and arithmetic for grades six to eight.

The second (1936) edition of these tests was given to over 40,000 students in January, 1936."

It has been decided to release the tests for nation-wide use, independent of the organized program, after grades have been established on the basis of the results of that program."

"It is said that the whole project is being conducted on a strictly non-commercial basis with no royalties being paid. All proceeds from the sale of the tests will be devoted to research and experimentation for the future production of improved materials and service."

The following selection is copied verbatim from the book by
Fish, Louis J.
Examinations Seventy-five Years Ago and Today.
Comparison & Results of Entrance Examinations to High School.
World Book Company, Yonkers-on-Hudson, New York 1930

1. The first thing noted in the examination in grammar for 1853 was a notation that "errors in spelling or in punctuation" were not to be counted. In other words, the emphasis was to be placed on technical phases of grammar; and the other aspects, such as clear expression and the correctness of composition, spelling, punctuation, and capitalization, were to be ignored entirely.

2. There have been such radical changes in the teaching of grammar within even recent years that it is hardly fair to expect present-day pupils to cope with the technicalities of formal grammar required seventy-five years ago. The present emphasis is not placed on parsing or diagraming.

3. The examination of 1928 lays emphasis on a minimum requirement in grammar. The emphasis is on free, clear, and well-worded expressions of thought. Nevertheless, it may not be said that grammatical correctness, spelling, punctuation, and capitalization are neglected. Deductions are made for the failure to employ them properly.

4. Shortly after the examination of 1853 a decline in emphasis upon technical grammar was inaugurated. This decline has been gradual, until present-day educators are unanimously in agreement upon a modicum of instruction in formal grammar.

5. In 1853 the purpose of the examination was to find what knowledge the pupil had of grammatical structure, declensions,

naming the parts of speech, plural formation of uncommon words, comparison of unusual adjectives and the parsing of simple sentences.

6. Therefore in 1853 no test was given for the power of expression in clear, grammatical English. Composition and its related spelling, punctuation, and capitalization were not required of the pupils seeking admission to high school. It appears incredible that the pupils of 1853 could have made a passing mark on the present-day examination. At that time English composition was not studied until the latter part of the high school course.

7. Present-day pupils had some difficulty with the examination of 1853, although without doubt sufficient grammar is now taught to eighth-grade pupils to enable them to secure an excellent mark. The pupils of 1853 also experienced difficulty with the same subject, as noted in the tabulations.

8. The 1853 test sought to ascertain what the child could retain and not what the child could express. It concerned itself with the technicalities which the child had acquired and did attempt to ascertain whether they functioned properly in written expression.

9. Grammar in and of itself is only a tool to correct English. to know the rules of grammar without a knowledge of their application is not satisfactory.

10. Grammar functions only in oral or written expression. Oral or written composition tests the power to use grammatical knowledge properly. The ability to memorize grammatical data and to remember rules does not necessarily lead to the correct use of

those rules unless there is practice in the application.

1. A comparison of these two examinations shows that in 1853 the examination in geography was factual and placed the emphasis on location. The questions did not involve the reasoning process in any way. In fact, they tend to minimize the importance of thought and judicial reflection on the part of pupils. In correcting such papers, the answers admit of no variation. For example: There is only one answer to the question, "What is the capital of Spain?" If the answer is not Madrid, no credit can be given. The entire examination is fundamentally a memory test.

2. The examination of 1928, while still emphasizing the factual and location aspects of geography, attempts to draw from the pupil reasons and conclusions based on a knowledge of facts. In this instance the student may exercise judgment in selecting the material for his answer. In the first question, "Why is New England an important manufacturing region?" undoubtedly many reasons could be given. But here the examiner adapts his standard of correct response to the age of the pupil and the knowledge which an eighth-grade pupil is expected to have on this subject. Throughout the 1928 examination the "why" and the "reason" are the significant factors. In this instance the examiner when correcting the papers must exercise judgment. Rarely can he give a mark of zero or a perfect mark to any answer. The answer in question 5 of the 1853 examination can be given full credit only if correct, or no credit at all if incorrect. The examiner marking the examination of today would have to give a failing mark which

might vary from 1 to 59, or give an A, B, or C which might vary from 60 to 98.

3. Such an examination as was given in 1853 may easily be passed by hasty cramming. The 1928 examination encourages reflection. It calls for the marshaling of related facts and for the selection of material requisite for the written answers.

4. The 1928 examination tests the relation of geographical facts in connection with human development - for geography, after all, is the story of the earth as the home of mankind. In this examination memory is less important than the development of the power to reason from the known facts to unknown facts. It demands organization of knowledge, such as occupations, products, climate, cities, and other geographical data in relation thereto.

The following selection is copied verbatim from Modern Methods in Written Examinations by Lang.

Ancient origin of examinations. Examinations have an ancient origin. It is not known when or where they first made their appearance. Their beginnings have long been lost in the hoary past. We read in the Old Testament of an examination in which, at the passage of the Jordan, the Gileadites tested the Ephraimites upon their ability to pronounce the work "Shibboleth." Any Ephraimite who failed to pronounce the aspirat and answered, "Sibboleth" was slain on the spot. On that fatal day forty-two thousand are reported to have failed in their examinations.

This tragic test is by no means the first instance of examination. Tests of mental and physical traits have been involved in the initiation ceremonies of primitive peoples from times long past. The passing of these was considered essential before assuming the responsibilities of adulthood. By at least 500 B.C. both the Athenian and Spartan Greeks held periodic examinations for testing the skill and capacities of their youth. The Spartans tested ability to endure pain by conducting regular examinations, in the formof whippings, before the altar of Artemis Orthia. Socrates in his famous method of teaching submitted his pupils to exhaustive and searching questioning. The catechetical method of teaching of the early Christians, with its questions and answers, have evolved from antiquity and have persisted down through the ages.

Influence of the medieval universities. The medieval universities have served in many respects as models for modern universities.

Prominent among the features copied from them is the examination idea. The early university was simply a guild or association of persons who were interested in teaching.

In common with the various trade guilds of the time the teaching guild had its successive stages of apprentice, journeyman, and master. Promotion from a lower stage to a higher one depended upon passing an examination. The completion of the apprentice stage entitled the candidate to the baccalaureate degree, and was determined by a test of his ability to define and explain terms. The completion of the journeyman stage entitled the candidate to the master's or doctor's degree, and was determined by a test of his ability to despute and to defend a thesis. There are records of such examinations at the University of Bologna as early as A.D.1219 and at the University of Paris by the end of the thirteenth century. Comenius, in his Great Didactic, planned university training only for those who could pass a rigid examination.

The examinations of the early universities were oral. The written form in universities seems to have been a development of the early eighteenth century. China, however, used a written form at least as early as the seventh or eighth century. Probably the first written examination at a university was in 1702, when it was introduced at Cambridge, England. Soon after this, Oxford and other English schools took up the written form. By the time the Pilgrim fathers came to America the examination system was fairly well established in England. There seems to be no doubt but that the universities of the middle ages gave the examination

system to our western civilization.

The Boston examination of 1845. The first examination of historic interest, in our own country, is the Boston examination of 1845. One of the early duties of the Boston school committee was to make a formal inspection of the schools each year. This included an oral examination of the pupils. As the schools grew and the number of pupils increased, it became an impossible task for the committeemen to examine all the pupils. A plan of restricting the examinations to the first (highest) class in each school accordingly was adopted. This, also, became an impossible task with the continued growth of the schools. As a result the annual inspection of the schools eventually became a perfunctory and formal official routine, without much significance. In 1848, the school committee concluded to appoint a sub-committee whose duty and responsibility it would be to make the annual examinations of the grammar department of all the schools of Boston. This sub-committee went about its task with much thoroughness and seriou sness. It decided to give a written examination, and to have a series of questions prepared and printed covering all the subjects which were then studied in the schools. Printed questions were decided upon in order to make the examination as fair as possible; to give all pupils the same opportunities; to avoid leading questions; to provide a permanent record of the examination; to determine what the pupils did not know, as well as what they did know; to examine readiness in written expression; and to test ability in grammatical sentence construction, punctuation, and spelling. The examination included the subjects of

astronomy, definitions, geography, grammar, history, and natural philosophy. Boston at that time had nineteen public grammar schools. The examinations were given to the highest classes, and included 530 pupils, or something over seven per cent of all the pupils enrolled in the Boston schools at that time. The pupils averaged somewhere around fourteen years of age. The examination was composed of 154 printed questions. There were 14 questions in grammar; natural philosophy had 20 questions; and the other subjects had about 30 questions each. From this it is evident that the Boston examination of 1845 was a comprehensive written examination.

The details of administering the Boston examination were worked out carefully. Precautions were taken to prevent any of the schools from getting advance information about the nature of the questions, which were prepared and printed secretly. The three committee members followed a secret schedule. By eight o'clock in the morning they appeared unannounced at different schools and commenced the examination. They gathered up the pupils' books and reference materials, seated them far enough from each other to prevent communication, advised them that they would have an hour for the examination, warned them against taking time to write handsomely as that would not be given consideration in the grading, passed out the printed questions on the subjects to be tested that day, and set them to work. At the end of the hour, the committee member gathered up the examination papers, hurried to his next school, remained there for an hour's examination, and on to the third, completing three schools during

the forenoon. In the afternoon three more schools were completed by each member of the committee, who finished in one day the examination for one subject in all the schools. The next day they took the questions of another subject, and continued in this way until they had completed their examination program for the school.

Careful thought was given to the preparation and scoring of the questions, and to the interpretation of the results. In the preparation of the examination the committee tried to graduate the questions simple enough for the poorest pupils to understand and answer, and to include others of sufficient difficulty to tax the powers of the best pupils. Rules were prepared for the scoring of the papers. These were used as guides, although they were not rigidly applied. The policy was to give the pupil the benefit of the doubt. Based upon the results the committee ranked the schools in order of merit according to the comparative number of correct answers given to the questions. The committee's interpretation of the ranking of the schools and the confidence they placed in the examination results were very constructive. They pointed out that the ranking was based on an approximate estimate of the intellectual acquirements of the pupils as shown by the examination, and not upon an absolute test of the merits of the schools. They emphasized the fact that the examination measured intellectual activity and acquirements only, and that there are traits of conscience, respect for order, religious sense, and the like which might reverse the ranking of the schools if taken into account.

The committee's interpretations and observations, based on the examination, furnish interesting and profitable reading for the teacher of to-day. The Report of the Grammar School Committee is reprinted in full by Caldwell and Courtis. One not only marvels, but actually thrills at the statements of these Boston men of 1845. (C. W. Caldwell and S. A. Curtis, THEN AND NOW IN EDUCATION, 1845-1923. Copyright, 1923, by World Book Company, Publishers, Yonkers-on-Hudson, New York.)

The completeness and thoroughness of this Boston Examination places it among the most remarkable incidents in the history of education in the United States.

Summary of directions for Preparing
and Using Objective Examinations.
from
PREPARATIONS AND USE OF NEW-TYPE
EXAMINATIONS by Paterson.

1. Questions covering every phase of the course should be utilized to insure wide sampling of pupil knowledge.

2. An excess number of questions should be prepared to allow ample opportunity for the selection of the best questions for the examination proper.

3. Ambiguous questions both with respect to meaning and possible answer should be rejected.

4. The apparent difficulty of a question should not be the basis for either accepting or rejecting a proposed question.

5. Acceptable questions should include an equal number of easy, hard, and moderately difficult questions.

6. The first half dozen or so questions should be so easy that practically all can answer them, thus serving as a "shock absorber."

7. Each acceptable question should be an independent unit in the examination.

8. Each acceptable question should be short.

9. The examination should include a very large number of questions.

10. Each form or type of question should be segregated, the examination consisting of as many parts as there are types of questions.

11. Within each part of the examination the questions should be arranged according to topical sequence in the course.

12. The examination itself should be preceded by suitable general directions.

13. Specific directions should be given for each segregated group of questions.

14. There should be a random arrangement of true-false questions, with approximately an equal number of true and false statements.

15. The correct answers among the alternative answers in the single-choice and in the plural-choice questions should be

placed according to chance.

16. A uniform method of marking the papers, together with the use of a colored pencil in scoring, should be used.

17. Scoring formulae should not be used except possibly for the true-false type of questions, when a right-minus-wrong scoring formula may be used.

18. "Weighting" of questions, according to difficulty or importance is rendered unnecessary in new-type examinations.

19. Total scores should be computed for the examination papers, distributed on a graph or table, and then a key for converting total scores into letter grades derived.

20. The examination should be mimeographed or printed, and both used and unused copies should be kept under lock and key in order to avoid the possibility of coaching.

21. The prevention of coaching should also be accomplished by using duplicate forms for classes in the same subject taking the examination at different hours or on different days and by changing the examination questions from semester to semester.

22. A large file of questions should be developed for each course, so that a reservoir of from 1500 to 2000 objective questions would be available from which examinations in endless variety could be quickly assembled and used as occasion demands. The ideal plan is to determine the diagnostic significance of each question, thus developing a large list of valid questions to be used in the preparation of examinations.

History of Exams.

"The writer has been using objective examinations since 1915, when, as an assistant in the Department of Psychology at Ohio State University, he learned from Dr. A. P. Weiss the technique involved. Reference is made in the bibliography to an article published by Dr. Weiss in 1911, describing the use of the COMPLETION TEST method of examining students in introductory psychology at the University of Missouri. One cannot discover the exact origin of such methods, for they were probably developed in one form or another in many places, The present widespread interest shown in schools and colleges, of course, is due to the successful use of objective examinations at Columbia University since 1919, these being made possible by the ingenious devices invented by Arthur S. Otis and successfully utilized in the Army Alpha intelligence tests, which were given to 1,700,000 draftees during the recent war."

Taken from page 42 PREPARATION AND USE OF NEW-TYPE EXAMINATIONS by Paterson (World Book Co. 1926.)

Def. of New-Type Exams.

<u>One-Word-Answer Recall Type</u>

This form requires as a correct answer a single word or phrase to be written by the student.

<u>Completion Form of Recall Type</u>

This form of question originated as an intelligence test many years ago, when the German psychologist Ebbinghaus first proposed its use as a psychological test method. It consists of the preparation of a statement with certain words omitted, the requirement being to supply the missing words so as to make the statement sensible.

True-False Form of Recognition Type

Discussion of this form is deferred, since its significance is better understood after the discussion of the form involving a choice among three or more alternatives.

Single-Choice Form of Recognition Type

This type of question presents a statement, together with several (usually four or five) alternative answers, only one of which is correct. The pupil is thus required to exercise his judgment as to the right answer by underlining or otherwise indicating which of the several alternative answers he considers to be correct. It is a test of his ability to recognize the right answer and to make a choice among several alternative answers.

True-False Form of Question

The True-False form of question is the most common of the various forms of the recognition type having but two alternative answers. Among the other forms is the one involving a choice between "yes" and "no" as, for example, in Test 6 of the Terman Group Test of Mental Ability, of which the first item is, "Are cartoons made by cameras? Yes No." Another form is that used in Test 3 of the same Terman test,

Alert-sluggish..... same-opposite

The true-false form of question has been used so commonly in the new-type examinations, that many have made the error of making no distinction between the new-type examination and the true-false question. As is evident from the foregoing description of different kinds of new-type questions, the true-false kind must be considered as only one of many forms of new-type questions.

Plural-Choice Form of Recognition Type

This type of question is merely an extension of the single-choice recognition form. It has been devised for use where the questions require two or more items in the answer. These two or more correct answers are given along with a number of unequivocally wrong but seductive alternatives.

Pairing or Matching Terms in Parallel Columns

This form has been used only to a slight extent in new-type examinations but is mentioned here because it is admirably adapted to testing certain kinds of knowledge.

The Anology Form of Question

This form is given special mention because of its difference from the ordinary question. It is especially well adapted to test a pupil's ability to see fundamental relationships between various items studied in a course. The question is based upon an analogy such as "Day is to night as white is to black." In giving the question, however, one of the four terms (usually the fourth) is omitted. The pupil may be required to supply the

missing term making it a recall-type question; but usually four or five alternative answers are given, only one of which is correct, and the pupil is required to choose the correct answer. The anology form of question is, therefore, of the recognition type.

Common Forms of New-Type Questions

One-Word-answer recall type

Completion form of recall type

True-false form of recognition type

Single-choice form of recognition type

True-false form of question

Plural-choice form of recognition type

Pairing or matching terms in parallel columns

The analogy form of question

Summarized Definition

By way of summary, we may characterize the old-type examination as requiring relatively long explanatory written answers to a small number of "how" type questions, whereas the new-type examination requires exceedingly short answers to a relatively large number of "key" questions, correct answers being symptomatic of total organized knowledge.

From PREPARATION AND USE OF NEW-TYPE EXAMINATIONS by Paterson, World Book Co. 1926.

From THE OBJECTIVE OR NEW-TYPE EXAMINATION by Ruch
Pub. by Scott, Foresman and Company, New York.

THE FUNCTIONS SERVED BY EXAMINATIONS

"Classification of the purposes of examinations. Although a great many specific functions have been claimed for the written examination by one writer or another, these may for present purposes be grouped as four, as follows:

1. Motivation of the learning of pupils.
2. Maintenance of standards of accomplishment.
3. Training in the use of the English language.
4. Measurement of accomplishment.

Examinations for motivation. It is unfortunate that we have so little direct information as to the motivating effect of examinations. That examinations do have this value has been tacitly agreed but never proved. In spite of this dearth of proved fact, it does seem reasonable to suppose that pupils strive for somewhat greater and somewhat more permanent mastery when they realize that searching examinations may be expected at a later date. If this conclusion is true, certain reforms in the examination system might greatly increase the value of the examination as a motivator.

Maintenance of standards of work. Many school supervisors feel that examinations and tests set by them offer a good means of control of standards of work by different teachers. This belief has led to the practice of conducting uniform city-, county-, and state-wide examinations. Such practices appear to be losing ground slowly, although almost fifty per cent of the individual states do have uniform state examinations in at least

the eighth grade."

Copied verbatim from CONSTRUCT ION AND USE OF ACHIEVEMENT EXAMINATIONS by Hawkes, Lindquist and Mann.

Summary:

1. That the great bulk of our present huge examining activity is achievement testing, using mainly the old essay-type examination, and devoted to the combined purposes of standards-enforcement and selection.

2. That the standards thus enforced are excellent and beneficial for one particular type of boy and girl and young man and young woman, namely, those of superior bookish ability.

3. That those same standards, however, because of their uniformity and rigidity, are thwarting and damaging to all other kinds and degrees of capacity.

4. That we need, therefore, to serve these other kinds and degrees, many more diversified standards, involving new kinds of courses and schools and methods and disciplines and goals.

5. That for the demonstration and maintenance of these new diversified standards we shall need a parallel diversification of achievement tests, of improved reliability.

6. That with the development of such diversification, however, the major use of examinations will come to be, not the enforcement of standards, but guidance.

7. That some parts of our present standards-enforcement examining are justifiable, including examinations for professional licensure and for admission, promotion, and graduation in

professional schools, endowed colleges, and private secondary and elementary schools.

8. That even in these cases our present standards-enforcing examinations need support and correction from cumulative records of many previous tests and other data in regard to the students' careers.

9. That the enforcement of uniform standards in public schools at any level must be condemned; which is merely a corollary of (3) and (4).

10. That the alleged utility of examinations as an incentive to study is largely an illusion and rationalization; at best a minor, incidental value realized only in cases where the goal set is thoroughly appropriate to the student's capacities.

11. That the utility claimed for examinations as a method of instruction can be genuinely realized only when examinations are used specifically for that end and divorced from standards-enforcement.

12. That the utility of examinations for the improvement of teaching is either synonymous with the enforcement of standards or highly dubious; contradicted, in fact, by claims that examinations tend to stultify teaching.

13. That such stultifying will, however, tend to disappear as we come to use more comprehensive tests, more diversified standards, and cumulative records.

14. That we have not yet developed the necessary technique for the safe general use of examinations results for the appraisal of teachers or departments; but that individual teachers may

profitably use such results for self-appraisal and self-diagnosis.

15. That, similarly, testing procedures cannot at present, if ever, be relied upon as a sole basis for the accrediting of schools and colleges, but may constitute a valuable item in accrediting, as contemplated in the new North Central Association criteria.

16. That the emergent major utility of examination is educational guidance.

17. That the developing doctrine of guidance demands, first, diversification of standards and courses and schools, and, second, the general introduction of the methods now available for the study of individuals.

18. That in examining for guidance we need all known kinds of tests, many of them, preferably comparable tests, and preferably tests used explicitly for this purpose.

19. That cumulative records are essential for the summation and interpretation of personnel data, including test results and other relevant information.

20. That the general use of examinations for guidance and of cumulative records will ultimately go far towards solving the problems of admission to college, professional and other vocational guidance, and the needed diversification of standards.

Copied verbatim from <u>REVIEW OF EDUCATIONAL RESEARCH</u> p.19-21.1933

These discussions of the technical aspects of test construction have shown that the problem of defining a field of subject

matter in which general achievement is to be measured, and the problem of selecting elements of that subjectmatter for the construction of items in a general achievement test, present very marked and signigicant differences. The items in a test do not by any means represent a random or representative sample of the content of the field in question. While every attempt should be made to make the sampling as representative as possible, certain items must be excluded because of technical consideration. What the test may contain is very largely a function of what has been learned and of what is the level and range of achievement in the group to be tested. The content of achievement tests, therefore, cannot be expected to parallel the course of study exactly, and such examinations can neither be used to "check" nor be checked by course of study outlines directly. The problem of selecting test items cannot be left to the subjectmatter expert or to the subjective judgment of any one but is mainly a technical problem, and must be based upon objective facts secured from actual trials of numbers of items with pupils of the kind to which the completed test is to be administered.

According to Colonel Parker

Colonel Francis Wayland Parker's work was based on a sympathetic affection for children. This fine, vital emotion dared defy tradition and convention. False ideals had in the past made education an inhuman process. "Faculties" were supposed to be developed by a dull mechanical routine of teaching. The result was intellectual and moral anaemia. Colonel Parker wanted

to replace these artificial supports by simple, natural methods. His work was, above all, human---work that dealt with human souls.

Colonel Parker was born Oct. 9, 1831 at Bedford, New Hampshire. He began teaching at the age of sixteen. He made, first of all, an appeal to the interest and enthusiasm of the children. This necessitated the abandonment of the textbook method of teaching and the development of a new skill in presenting the lesson. He believed that number should be taught by the objective method.

Next to the text-book, the greatest obstacle in the way of real teaching was the standard of examinations. Examinations were usually given simply to test the pupil's power of memorizing disconnected facts. They should test the conditions and progress of mental growth in the children. Moreover, perfect freedom should be given the teacher to do the best work in her own way without regard for false standards.

Francis Wayland Parker was a brilliant apostle of the New Education. He introduced many reforms that seemed radical in his time, but which are now generally practiced by the schools.

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"They avoid opinion in scoring.
They obviate ambigous answers.
They obviate irrelevant responses.
They provide fine scoring units.
The units are standardized.
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More and greater variety of material.
More like life situations.
No premium on "wordiness."
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